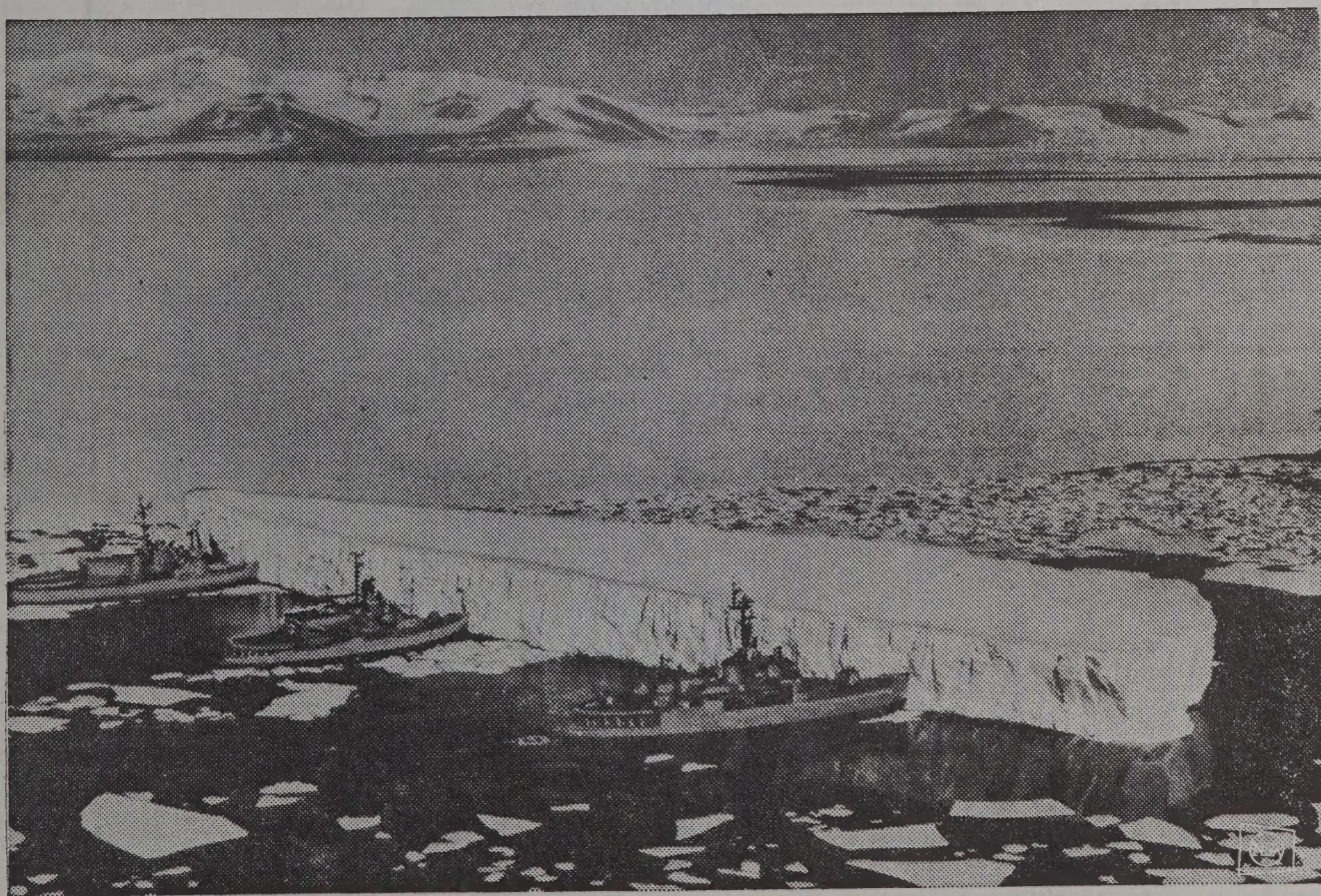


THE POLAR TIMES



MOVING THE MOUNTAIN—It's an even bigger moving job than it appears. Three Navy icebreakers, teaming up to keep the shipping channel free into the U.S. McMurdo Sound Antarctic station, nudge a mountainous iceberg measuring 800 by 200 feet and towering 80 feet above the water. But this is only one-eighth of the berg's bulk. The rest of the ice mountain is submerged beneath the surface.



PROBING THE SECRETS OF THE ANTARCTIC

Highlights of the Antarctic exploration season now ending included establishment of the world's most remote polar base at Plateau Station (1). En route to it a tractor party detected by radar a mountain range under a mile of ice (2). Geologists found geologic evidence in Mountains (3 and 4) indicated Antarctica may once have been attached to India. Near Byrd Station (5) snow was collected to see if gasoline lead has seriously polluted the world's air. At McMurdo Sound (6) an observation buoy was lowered through a hole in the ice for study of sea ice formation from below. The photograph was taken by a frogman.



The Polar Times

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New Steps In Exploring Antarctica

By WALTER SULLIVAN

The New York Times

Near the crown of the great ice sheet that covers Antarctica, eight Americans have begun an eight-month vigil at a newly established camp in the loneliest and possibly coldest polar station ever established.

As the current season of Antarctic activity draws to a close, other American scientists have returned home with clues to the past arrangement of the continents. They have found what they take to be evidence that frigid Antarctica and torrid India were once part of a single land mass.

Others are bringing home specimens of snow whose lead content may bear upon the health of all the world's people. Still others have data collected with a revolutionary new exploration tool: a radar that can look straight down through a mile or more of ice and chart the mountains, canyons, plains and hills of a buried continent. With it a monumental but invisible mountain range has been found.

The new polar base is known as Plateau Station since it lies in the heart of the South polar plateau. At an elevation of 11,500 feet it is higher than any other occupied polar station. The so-called Pole of Inaccessibility, site of a former Soviet station, is farther from the coast than Plateau Station, but nearer to other Antarctic bases, namely the American outpost at the South Pole. It has been predicted that the temperature at the new station may drop to a new record of -130 degrees Fahrenheit.

The task of the four scientists and four Navy men at this tiny oasis in a white desert is to monitor a variety of phenomena, from weather to auroral displays and magnetic storms. The location of the camp near the summit and center of the continent puts it in a location that can be likened to the "eye" of a hurricane—a region of little wind and precipitation surrounded by violence.

The men have been provided with ample food, fuel and a Navy medical officer, but there are two perils that are hard to guard against. One is fire, which could suddenly turn the men out into unbearable cold. In case that happens, there is an emergency camp with supplies 1,000 yards away. The other is a possibility that the diesel oil that generates their elec-

U.S. Sets Up New Antarctic Station

The New York Times

WASHINGTON, April 30—The United States has established an Antarctic research base, 600 miles from the South Pole.

It has been named Plateau Station and it is expected that the temperature there will drop to 130 degrees below zero Fahrenheit.

Douglas Elvers, a geophysicist with the Environmental Science Services Administration, said the coldest temperature previously recorded in Antarctica by the United States was 113 degrees below zero.

The base has been erected by the Navy on one of Antarctica's highest plateaus on snow and ice almost two miles thick.

tric power and feeds their heaters will congeal or leak away. At temperatures below -100 degrees diesel oil becomes as thick as jelly. It is stored in two 25,000-gallon bladders whose contents are slowly, but continuously, circulated and heated by exhaust from the power generators.

The outdoor joints in this system will be inspected regularly to make sure none has cracked from the extreme cold. Daily excursions into the outer cold will also have to be made to read magnetic instruments and make observations from the emergency camp as weather balloons soar aloft. Since the station has no radar, wind directions and velocities at various levels can only be determined by sightings on the rising balloon from two locations.

The camp consists of four vans, which were flown in and arranged in parallel pairs, end to end, with an open space between. The space was floored and roofed to provide a "permawalk" in which the men dine and lounge. Their bunks, kitchen, washroom, generator, communications and scientific equipment were preinstalled in the vans. A fifth van plus a pad-covered hut constitute the emergency camp.

Plateau Station was the destination of a tractor journey on which the ice radar was used. The trek, using three "sno-cats," followed two legs of a zigzag route that should ultimately traverse the last great unknown region of Antarctica between the South Pole and the coast.

A year ago the portion between the South Pole and the abandoned Soviet camp at the Pole of Inaccessibility was covered. During the current season the trek continued another 830 miles along two legs



The New York Times May 1, 1966
Site of new station (cross)

ending at Plateau Station.

The ten-man party was led by Dr. Edgar E. Picciotto of Belgium. It included a Norwegian ice specialist as well as eight Americans. Dr. Picciotto has returned home after reporting enthusiastically in Washington on the radar performance. It provided an almost continuous profile of the buried land, including subtle hills and valleys. Explosion soundings were also made, but gave only a rough picture of the terrain.

The radar indicated at one stage that the vehicles were moving across an extremely steep rise. In the course of five miles, the land rose 5,000 feet, although the summit of this rise was, still almost a mile below the surface of the ice. This smoothness was deceptive, for one vehicle partially broke through a snow bridge into a deep crevasse.

It had been assumed that on the vast polar plateau, level as the Western plains and hundreds of miles from any visible mountains, there would be no danger from crevasses. Instead, at one point the party ran into a major crevasse field, even though the mountain summits seemed at least a half mile below. The men turned back onto the reverse leg of their zigzag route and soon ran into what may have been an extension of the same crevasse field.

Apparently a great mountain range, completely buried under ice, traverses that part of the continent. It may be related to Gamburtsev Mountain, a lofty feature discovered under the ice by the Russians 550 miles to the east.

The effort to fit the southern continents together like a jigsaw puzzle was described Feb. 18 by Dr. Lawrence A. Frakes of the University of California at Los Angeles, who has just returned

U.S. BUILDS 7TH BASE IN ANTARCTICA STUDY

WASHINGTON (Science Service)—The United States is building a new research station high on a remote icy plateau of Antarctica. Russia and Australia are both building new stations to replace older ones damaged by ice and snow. Japan has reopened a station, and Norway has closed one.

In an expanding search to probe the icy secrets of Antarctica, scientists from 12 nations are setting up instruments to study the wind, ice, cosmic radiations and animal and plant life of the surrounding oceans.

Of all the scientific programs, the United States maintains the largest. The new Plateau Station, due to be finished soon, will be the seventh scientific base operated by the United States. This station is part of a program sponsored by the National Science Foundation and the Navy to transport, shelter, feed and sometimes rescue about 150 to 175 scientists and 2,500 to 4,000 assistants. About a dozen ships and a squadron of aircraft help in the operation, which costs about \$28,000,000 a year.

Four scientists and four assistants will be stationed at Plateau Station on Queen Maud Land, on a lonely 13,000-foot ridge where no plant or animal grows naturally, and the nearest human community is about 600 miles away. The station will be at an altitude of 11,500 feet, where temperatures sometimes drop to 120 degrees below zero. Here men will study the meteorology of the lower atmosphere, solar and other cosmic radiations, and will conduct limited medical experiments. The station will be operated on a round-the-year basis for two years.

from combing the Antarctic mountains for evidence. He and Dr. John Crowell, head of the university's Geology Department, have undertaken a long-term effort to determine, through detailed studies on many continents, whether they have changed their relative positions, as many now suspect.

Their search is for tillites, formations derived from rocky debris left by ancient glaciers. Such formations, dating from the late Paleozoic era, 200 to 300 million years ago, have been found in India and the southern continents. Just as fragments of the picture aid in piecing together a jigsaw puzzle, the California geologists hope to use the tillites in reconstructing the former supercontinent.

To this end Dr. Frakes has studied tillites in the Falkland Islands, off Argentina. He has just returned from the Antarctic, where many such deposits have recently

been found, and leaves in a few days for South America. The work will continue in Antarctica and will be extended to Africa, Australia, Tasmania and India.

The search for lead in snow layers has been carried out by Dr. Clair C. Patterson and his colleagues from the California Institute of Technology. They had earlier found evidence, in recent and older layers of Greenland snow, that there has been a sharp increase in the lead content of the atmosphere since leaded gasoline came into use. Dr. Patterson's warning that this might be a health hazard was challenged. His Antarctic snow samples are designed to test the validity of his Greenland measurements.

From a deep "snow mine" at Byrd Station samples of snow that fell up to 60 years ago were collected. To obtain recent snow, free from contamination by smoke from the station, the group went 125 miles upwind.

All told there were 28 American scientific parties in the field this past season. They were lifted by Army helicopters over mountain fastnesses never trod by man. Navy transport planes, landing on skis, kept them supplied.

The various expeditions, according to tradition, exchanged scientists. Americans served with parties from Argentina, Australia, Chile, Japan, South Africa and the Soviet Union. This is the 11th year of continuous American occupation of research stations in Antarctica.

Cool Thought—116 Below

Christchurch, New Zealand, June 24 (Reuters)—American scientists in the Antarctic have recorded the lowest temperature ever reached at an American Antarctic base—116 degrees below zero fahrenheit—at Plateau Station June 13.

Antarctic Voyage Ends

BOSTON, April 9 (AP)—The Coast Guard icebreaker Eastwind, carrying nearly 200 men, has returned from her 10th voyage to the Antarctic.

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AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

Back issues are 50 cents each.

Coldest Site Described

Washington — The United States is building a new Antarctic base on what may prove to be the world's coldest occupied site.

The tiny outpost, to be known as Plateau Station, will sit atop a 13,000-foot ridge on Antarctica's ice-mantled continental plateau. Men at the station have no neighbors closer than the South Pole, 600 miles away.

The present world's record low temperature — 127 degrees below zero Fahrenheit — was reported 800 miles away at the Soviet Union's Vostok station on Aug. 24, 1960.

* * *

VOSTOK has an altitude of 11,444 feet. Plateau Station will be about 1,500 feet higher and slightly closer to the Pole. Hence, officials of the National Science Foundation, which finances and coordinates scientists working under the U. S. Antarctic Research Program, believe the new station may be even colder than the Russian site. Temperatures at Plateau could ap-

proach 130 degrees below zero.

World record temperatures are based on measurements made near the surface of the ground to give the degree of cold or heat that a man standing on the ground would feel. Since temperatures decline with altitude, colder temperatures can be recorded by balloons. In distant space, temperatures approach absolute zero.

* * *

SPRING CAME to Antarctica as autumn arrived in the northern hemisphere. Starting in October, ships and planes began resupplying bases that will be isolated through the long winter.

American scientists resumed work on the world's longest radio antenna in the 1965-66 season. The antenna is a 21-mile-long, plastic-coated, copper cable laid over snow and ice that is a mile and a half deep. Located 900 miles from the Pole, the antenna is twice as long as any other in the world. It will radiate low-frequency waves of the sort

generated naturally by lightning.

These lightning-induced radio signals are known as "whistlers," because of the whistling sound they make in receivers. Whistlers get trapped in the earth's magnetic lines of force and bounce back and forth between the North and South Poles.

Research on whistlers may have important bearing on future communications. Very low frequency waves might be useful when solar radiation blacks out higher frequency communications on the earth.

Dr. Laurence Gould Named Chairman of a New College

The election of Dr. Lawrence McKinley Gould, former president of the American Association for the Advancement of Science, as chairman of the board of trustees of Prescott College, which will open at Prescott, Ariz., this fall, was announced June 21.

The announcement was made by Dr. Ronald C. Narin, president of the college at a news conference at the office of the United Church of Christ, 298 Park Avenue South. At the same time it was announced that the United Church of Christ had donated \$250,000 to the college, which will be related to the church but not controlled by it.

Dr. Gould, who is a geologist, is president emeritus of Carleton College, in Northfield, Minn., and former head of the Committee on Polar Research of the National Academy of Sciences. At present, he is a professor of geology at the University of Arizona.

The new college will open with a class of 120



ELISHA KENT KANE MEDAL of the Geographical Society of Philadelphia is presented to Antarctic explorer Capt. Finn Ronne (left) by society president Harry L. Archey, Jr.

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BRADFORD WASHBURN

RESCUE PLANE OFF TO THE ANTARCTIC

Serviceman Seriously Ill—
Flight Called Hazardous

WASHINGTON, June 5 (AP) — A Navy Hercules plane left Christchurch, New Zealand, tonight on an eight-hour flight to Antarctica, to pick up a seriously ill United States serviceman, the Navy reported.

A spokesman said that this was only the second time in the 12-year history of the Navy's Operation Deep Freeze that an airplane has flown into Antarctica during the midwinter darkness there.

The plane will land at Williams field, near McMurdo Station on the perimeter of Antarctica, to evacuate Robert L. Mayfield of Forest City, Ark., a utility pipefitter. He is reported suffering from a ruptured bladder.

The spokesman said that the flight was particularly dangerous at this time of year and that such missions were limited to emergencies. Normally the flying season ends March 1 for six months, and the 250-man wintering-over force is cut off from the rest of the world except for radio contact.

The spokesman said the flight was dangerous "because it's pitch black, the weather is extreme — temperatures down in the minus 40's, 50's — the capability of knowing what the weather is is our most dangerous element. We have limited weather reporting stations en route and on the continent during the winter."

He added there were no runway lights and the pilot would have to rely on barrels of burning oil lining the runway to land the ski-equipped craft.

The ailing serviceman is to be hospitalized at Christchurch.

The spokesman said the New Zealand Navy frigate Taranaki had been dispatched to a point midway in the flight in case the plane goes down in the icy ocean. Royal New Zealand Air Force planes were also reported standing by.

CHRISTCHURCH, New Zealand, Tuesday, June 7 (Reuters) — A ski-equipped United States Navy aircraft today completed a round-trip flight into the Antarctic in mid-winter.

The plane flew an injured American seaman, Petty Officer Robert L. Mayfield of Forest City, Ark., from McMurdo Sound on the coast of Antarctica to a New Zealand hospital.

Mr. Mayfield was taken early this morning to Christchurch Hospital, where his condition was reported as fairly satisfactory. He had a ruptured bladder.

Age of Antarctic Ice Pushed Back

By R. J. R. JOHNSON

ST. PAUL DISPATCH

University of Minnesota geologists have come up with evidence that the antarctic ice cap may be vastly older than had been generally believed.

Studies of rock formations from the Jones mountains of West Antarctica indicate that area was glaciated 11 or even 20 million years ago, said Dr. Campbell Craddock, head of the university's Antarctic research program.

The ice age in the northern hemisphere began about a million years ago during Pleistocene times, Craddock said, and the same period was widely accepted as the beginning of the southern ice age.

Craddock now believes Antarctica was ice-covered during what geologists call the Miocene epoch of the Tertiary period — a time when the Alps and Himalayas were being formed.

THE NEW EVIDENCE comes from radiometric analysis of the rocks. But getting the rocks was something of a problem. It's a Minnesota story, all the way.

Craddock discovered the mountains, a range of low peaks just about due south of here, on an aerial survey flight in January, 1960.

The next year a team of University of Minnesota geologists went into the mountains for a closer look. The men hauled their equipment 40 miles.

"Those were the days when men were men," Craddock said with a chuckle. "It was the first and last time I'll ever do anything like that."

THE FIELD PARTY found a series of flat-lying lava flows that were assumed to be Pleistocene. Rocks beneath the lava were scoured, scratched and grooved in a manner that suggested the work of glaciers.

But how old were the

rocks?

The lava was analyzed in the laboratory. Certain elements, such as argon, are produced at a known rate when radioactive materials in rocks decay. So, by measuring the amount of argon and the amount of its remaining "parent" radioactive element, scientists are able to get an idea of the age of a rock sample.

These studies indicated the lava was not laid down in the Pleistocene period as had been assumed, but dated back to the Miocene, which ended some 11 million years ago and began about 25 million years ago.

ACTUALLY, Craddock said, the radiometric results were "wild." Lava samples from two localities yielded ages of 20 to 22 million years — which is just about the limit of capability of radiometric measuring.

One sample showed up 10 times older than it could be, perhaps because some argon was "inherited" from older rocks in the lava.

But Craddock and his co-workers are convinced that they are definitely dealing with Miocene lava, at least 11 million years old.

"For the sake of skating on somewhat thicker ice, we're sticking with the minimum age," said Robert Rutford, research in geology who recently wrote a paper on the subject.

THE MINNESOTA people also determined — to their own satisfaction, at least — that the marks on the lower rocks were caused by glacial action.

"There are other ways the rocks could have been grooved," Craddock said.

During the 1963-64 Antarctic season, Rutford and another Minnesota geologist, Thomas Bastien, were able to get into the Jones mountains again, but only for one day.

It was time enough, though, for them to take further measurements and study more closely the relationship between the lava and the underlying rock.

THE SCRATCHES in the lower rock appear to have been very fresh when the lava covered them, Craddock said. The hot lava may well have melted through ice to cover the scarred rocks below.

Craddock said the evidence is "not very aesthetically pleasing—it's all suggestive evidence" and more work is being done to pin down the rock dating.

"I wish we could wrap this up in a stronger case before we stick our neck out," he said.

He believes that if the evidence is right it would apply to the whole continent, demonstrating that Antarctica was under ice at least 10 million years before the successive advance and retreat of northern glaciers began.

VERY LITTLE has been written about the age of the present Antarctic ice cap, Craddock said. An assumption that it began about the same time as the northern ice age has been prevalent.

(The discovery of proof that Antarctica has gone through great climatic changes in ancient times caused a lot of excitement.)

The Arctic and Antarctic are vastly different places — one being an ocean; the other a continent — so it shouldn't be surprising that their history has turned out to be different, Craddock said.

He believes the altitude of Antarctica (it's the highest continent in the world) has had much to do with its climate.

BOTH CRADDOCK and Rutford cited a growing amount of indirect evidence to support their theory of ice cap ages. Rutford said deep-sea cores from the Pacific and Australia indicate a continued fossils from New Zealand and cooling trend from the middle of the Tertiary period to the Pleistocene.

Dr. Laurence Gould, former president of Carleton college and veteran Antarctic scientist, said he was excited by the news from Minnesota. He said he had suggested the possibility the ice cap began in the Tertiary a number of years ago.

"Most of my fellow glacial geologists laughed at me," he said. "I hope Cam Craddock will enable me to thumb my nose at them."



What is lure of South Pole?

By ROBERT BUCKHORN

SOUTH POLE, Antarctica (UPI) —When Captain Robert Scott reached the South Pole 53 years ago he scribbled these words in his diary: "Great God! This is an awful place."

Nothing has changed since then. The South Pole today still is an awful place.

It killed Scott. And it will do the same to anyone today who ignores the rules.

Despite all this, Americans have been living continually at the bottom of the world since 1957. Moreover, these seems to be no end to the American lease on this most inhospitable spot on earth.

Why would anyone want to live in a place where the temperature has hit 113 degrees below zero? Where a night is five-months long. And where the air is so thin that newcomers pant and cough like a man on his death bed.

For the sake of science is the most oft-repeated answer. But there are other answers. National prestige is involved. The United States has done more to unlock the mysteries of Antarctica than any other nation.

There is also the continent's "future" school of supporters. These are the scientists, military men, and government officials who say that Antarctica's time is yet to come.

They urge patience. Antarctica is a strategically located land mass. Its value may come when polar orbiting satellites open as yet undreamed of new vistas for man. Or, they say, the time is coming when the world's growing population may force man to seek the mineral wealth that lies beneath the icecap.

Wait, they say. When Antarctica comes of age, the United States will be in a primary position.

The American commitment in Antarctica goes back to 1839 when a U.S. Navy lieutenant named Charles Wilkes led six wooden ships to the area and proved it was indeed a continental land mass.

This year, a giant Hercules turboprop transport plane touched down on the ice off McMurdo Sound to open Operation Deep Freeze '66 a combined Navy and scientific

venture now in its 10th year.

To support the scientific operation, the Navy is spending \$20 million. The government-run National Science Foundation adds another \$7.5 million in grants to scientists for their Antarctic projects.

What is the taxpayer getting for his money? Is the effort worth it?

Most observers agreed that on a dollar-for-dollar basis, the returns in Antarctica probably are as great as for any other project of its size.

To understand this, one must understand the Antarctic. First, it is a place of superlatives. It is the coldest, windiest, and driest place on earth.

In size, it is as big as the United States and Europe combined. At the South Pole, the snow is nearly two miles deep. If the icecap covering the land mass were to melt, the oceans of the world would rise 200 feet, drowning every coastal city on earth.

It has spawned icebergs over 200 miles long and 60 miles wide—bigger than Belgium. It has a live volcano, but only microscopic plant life.

The oceans around it are teeming with plant food. The plants share the frigid waters with vicious killer whales, and 1,200-pound Weddell seals, which can dive a quarter of a mile deep. There are comic penguins by the tens of thousands and birds who spend half the year in the Antarctic and the other half in the Arctic.

Under the icecap there are fossils of a land that used to be. Ferns and pines have been found. There is coal, gold, copper, zinc and tin. Not to mention the possibility of oil, though none had been found as yet.

There is no doubt that man could mine any of these minerals if he wanted to. But so far there has been no real demand. The main drawback is expense.

The real reason for being here is to be found in the minds of the men who come to work.

These are the seismologist, the glaciologists, the meteorologists, the physicists, the biologists—and representatives of nearly every other field in the entire spectrum of science.

The scientists see Antarctica



as just one thing—a chance to turn yesterday's world into a benefit for tomorrow's man.

SOUTH POLE, Antarctica (UPI) —In Antarctica today, the scientist is king of the continent.

The old era explorer is gone. His place taken by a geologist, a physicist, or a biologist. When these men travel, they go by helicopter, not dog sled.

Every plane leaving Antarctica today is loaded with records and specimens. One crate may be marked "penguin embryos." Another, "a report on the effects of high altitude living on the cardiovascular system."

Operating under grants from the National Science Foundation, these scientists have studded the once untameable Antarctic with nuclear reactors, a satellite tracking station, seismographs, cosmic ray laboratories and undersea ice chambers.

They scamper over a glacier to measure its size and movement. They capture mites from under ages-old rock, and listen for hours to nature-made radio signals in outer space.

They are, in effect, making the Antarctic's 6 million square miles into a super laboratory.

Their choice is a good one. The continent covers almost 7 per cent of the globe. It is unpopulated, and uncontaminated.

Better still for the scientist, it is not a part of the East-West cold war.

Russia maintains three bases in the Antarctic—Vostok, Mirny and Molodezhnaya. Its effort is second only to the United States. But unlike other places, its Antarctic bases follow the continent's open door policy.

There is a complete exchange of information between America and Russian scientists. Each side offers the other the hospitality and facilities of their stations. And each season an American winters over at a

Russian station and a Soviet scientist comes to an American base.

One of the key factors in keeping the continent free of politics is the Antarctic treaty ratified in 1961. Under this agreement, the nations with claims in the area agreed to bar nuclear weapons and not to press new territorial claims, or to block the peaceful pursuit of scientific knowledge.

With this protection and encouragement, what exactly are the scientist accomplishing.

The answer is hard to supply in terms of concrete results that would be applicable to every day living. Most of the research in the continent is "pure" with no immediate practical use.

Information is being collected, phenomena investigated, and theories tried out.

William Pinckard, a marine mammalogist, is an example. Pinckard is trying to find out whether the Weddell seal talks a language.

He can be found on the ice of the Ross Sea with a tape recorder and a hydrophone tracking his quarry, who is famed for its quarter-mile-deep dives and its ability to locate food and air holes in the darkness under the ice.

Most certainly it uses some type of sonar — that is a system of sounds — to navigate. The same sounds form part of language, Pinckard feels.

Playing his tape recordings of seal sounds, Pinckard is gradually isolating what he thinks are words in the seal's vocabulary. Hunger, alarm, navigation, mating — all of these can be expressed by one seal to another, Pinckard feels.

If he does solve the riddle, will it have any practical application? One possibility might be the development of a more sophisticated system of undersea navigation for submarines.

Allison spends most of his

time at the Adelie penguin rookeries, lifting the birds up by the tail feathers and scribbling numbers on their eggs.

Why? Allison is trying to trace the incubation period of the birds. Along with this, he wants to know how one penguin can identify another among thousands of the look-alike birds.

Another scientist sits in a long ice tunnel watching a seismograph report the movement of the earth's crust. Still another watches the auroral australis—the southern lights—from what is the best possible location, the bottom of the world.

No one knows what Antarctica's future will be. But science has brought it a long way from the time the early explorers brought back reports of a "terrible, silent, windswept immensity."

SOUTH POLE, Antarctica (UPI) —The United States is spending \$27 million this year on what must be the biggest nothing on earth—Antarctica.

This is a place where the snow piles two miles deep. Where the killer whale finds sport in ripping the tongue from the blue whale, a creature twice the size of the largest dinosaur.

This is a place covered by nine-tenths of all the ice in the world. A place where a man can die simply by breathing too deeply when the temperature falls below the 100 degree minus mark.

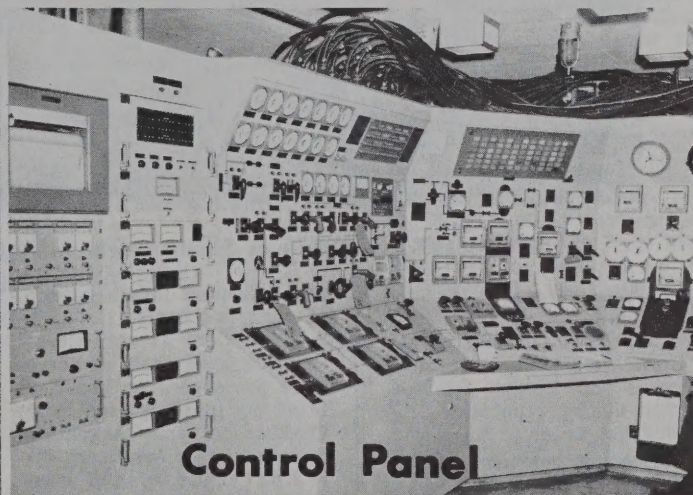
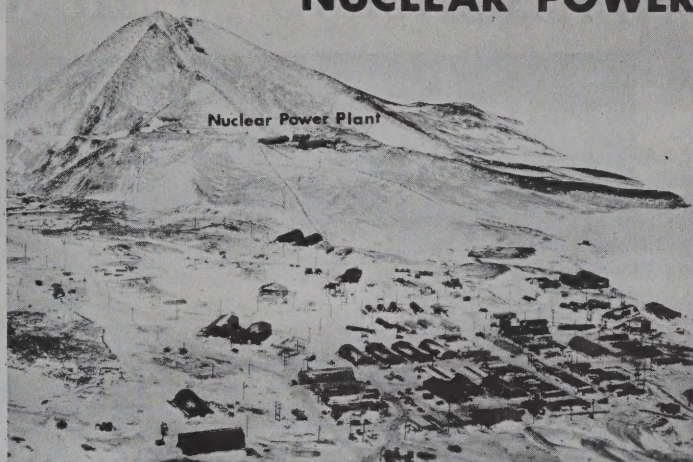
It is permanent home to no one, and hasn't been for millions of years. Its five-month long darkness can unnerve the weak, and its most famous landmark—the South Pole—is geographically nothing more than a silent, wind-scarred plateau, distinguished only by its unbelievable loneliness.

If all this is true, why is the United States there? Why does the government's National Science Foundation spend \$7 million on scientific grants for Antarctica? Or the Navy \$20 million to operate this year's Operation Deep Freeze '66, the logistic support program for Antarctica.

If there is a one-word answer, it must be "promise." It is not today that is thought of in Antarctica, but tomorrow.

Bits and pieces of tomorrow's Antarctica already are in place. At McMurdo Sound, the biggest American base on the continent, a nuclear power plant

NUCLEAR POWER



clings to the side of a volcanic peak. Nearby is Antarctica's first sea water distillation plant.

At Byrd Station, 800 miles inland, a tracking station tunes in on polar orbiting satellites. At Palmer Peninsula, a cruise ship is giving tourists their first glimpse of a frozen continent.

Three thousand miles away, at the Russian base of Mirny, a scientist from the United States carries out experiments unbothered by the cold war. This was part of Rear Adm. Richard E. Byrd's dream. The famed Antarctic explorer saw the continent as a place where nations would work together "in the cause of science."

Not everyone agrees with Byrd. Rear Adm. Fred E. Bakutis, the commander of Operation Deep Freeze '66, doesn't see any great future for Antarctica.

He doesn't think it will be "anything more than it is right now—that is a laboratory for pure scientific research."

There are others who think differently. They point to the

possible use of Antarctica as a giant cold storage plant for preserving food that will be needed to feed the billions of persons expected to inhabit the globe in succeeding generations.

If that is too distant a prospect, they point to the steady erosion of the world's known mineral supplies. But Antarctica, they say, contains coal, copper, gold and diamonds. In all 200 minerals have been identified so far, they said.

Antarctica's supporters admit the supply of minerals might be too expensive to mine today. But with nuclear power coming of age, this might be changed, they say.

Nuclear power figures high with those who are backing Antarctica's future.

They visualize a type of greenhouse living with nuclear power providing both heat and the means to grow food behind glass.

Added to this hope, they point to the airplane. Fifty years ago men and dog teams were the

ANTARCTIC ICE FLOW LINKED TO VOLCANO

WASHINGTON, (Science Service) — A raging river of melted glacier ice is believed to have flooded a valley in Antarctica several centuries ago, cutting deep winding channels in bedrock.

For years scientists have puzzled over the strange eroded terrain that covers about seven square miles at the head of Wright Valley, west of Ross Island. Some thought the rock was carved by ordinary melted-glacier water that had been dammed by a wall of glacier ice to form a lake and then suddenly poured down the valley when the ice dam gave way.

What really must have happened, reports Dr. Charles R. Warren of the United States Geological Survey, was that a volcano under the thick glacier ice erupted, creating a great flood that may have carried more water than any river ever seen by man. The suspected volcano has not been probed, but it is probably deep under the ice as are the other volcanoes in the region.

Evidence of the volcanic flood is the low content of "heavy water," which is water in which the molecules contain deuterium in Lake Vanda in the deepest part of Wright Valley. This permanently frozen lake, more than five miles long and one and a half miles wide, has less deuterium in the salty water at the bottom than most glaciers and melt-water.

Dr. Warren estimates that this could happen only if that part of the water entered the lake from the west—from the volcanic eruption. The only water entering the lake now comes from the east.

Mating Roles of Penguins

Courtship customs are reversed among Antarctica's Emperor penguins, the National Geographic says. Females take the initiative in courting. The males incubate the eggs.

main means of travel in Antarctica. Today the plane and the helicopter have revolutionized travel. The next step coming shortly, they say, is a 24-hour air operation. Now air operations shut down when the winter darkness sets in, leaving the continent isolated.

Once the all-weather airfields are built, commercial airlines will use the continent for the shortest routes linking Africa, South America, and Australia, they say.

With commercial airlines will come tourists. After that, the booster say, women will follow their men to the bottom of the world and the continent will be tamed for their children.

COLD FACTS ON CRUISING NEAR ANTARCTICA

By MARY P. GOODWIN

The New York Times

MY husband and I are what might be called continent collectors. In our travels, we have amassed such assorted areas as Point Barrow in Alaska, the Gobi Desert in Asia, Christchurch, N. Z., and Jakarta, to name the more improbable. And now, we have recently added what is surely the most improbable of all—Antarctica.

We did this between last Jan. 13 and Feb. 11, thanks to a seductive advertisement in the press. And we have returned with memories of the most ostensibly inhospitable region on this globe—a region of drastic storms, sunless skies, ferocious killer whales, vicious sea leopards and almost microscopic land creatures. The last-named are so-called mites and "spring-tails," both insects.

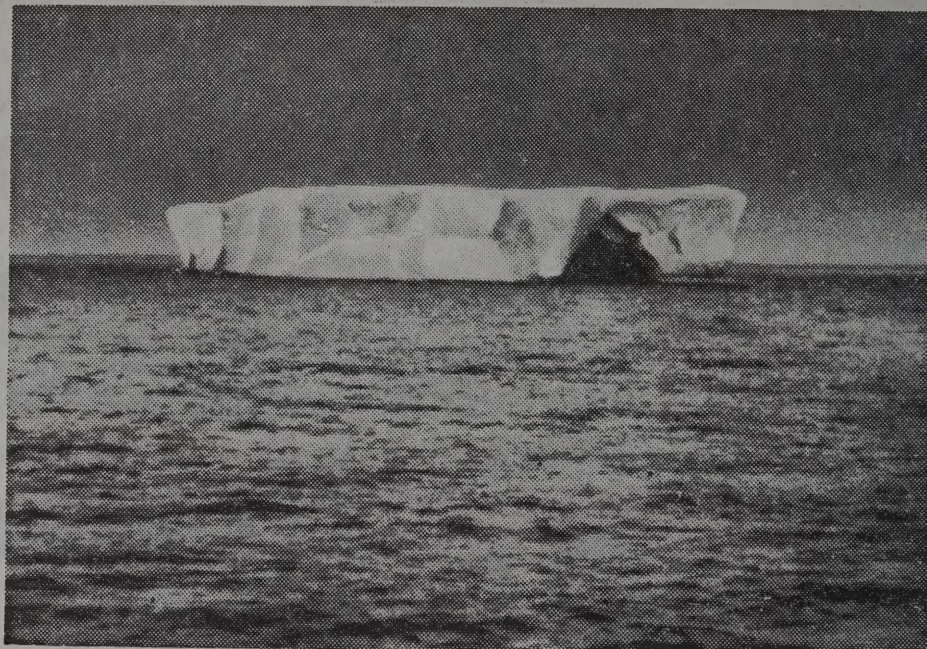
We had about 10 days close to the Antarctic Circle, making landings on a number of weird stretches of northwestern Antarctica and adjacent islands. The rest of the time was spent getting there and back from Cape Horn, at the tip of South America.

There were about 50 tourists in our party. We sailed on the 7,000-ton Argentine cruiser Lapataia; as her faithful guardian and escort, she had the little Argentine Navy tug, the Comandante Irigoyen.

We first flew to Buenos Aires, where we boarded the Lapataia for a week's voyage down the coast to Tierra del Fuego. Our port was the Argentinian city of Ushuaia, in the Beagle Channel; the channel is named for Charles Darwin's tiny ship, which visited the area in 1827.

There, we found a low-altitude landscape of evergreens and deciduous trees, climbing to glacier-covered mountains. Too, there was a constant wind so cold that it was hard to believe that the Indians of the region could have survived in Darwin's day without clothing.

Yet, Darwin describes a naked mother nursing a naked infant, while snow and sleet fell on her and on the child. Today, the descendants of those Indians wear Madras shirts and bluejeans. They are lumberjacks, working around the Naval base there, and shepherds.



Mary P. Goodwin

MASSIVE ICEBERG—A familiar sight in Antarctic waters.

When we sailed to the southeast out of the Beagle Channel, and past misty Cape Horn, we met the long, deep swells of Drake Passage. This is, by reputation, the roughest water in the world.

I cannot comment on the 40-hour crossing. We were told that we were "sneaking between two low-pressure areas" and that it was an exceptionally calm voyage. However, for me it was disastrous.

On the gray morning following, at a position just west of Smith Island, we saw the island looming high; actually, it was 35 miles off. We also saw our first iceberg, properly majestic, and what we were told was "iceblink," or pack ice. It took us four hours more to reach the southernmost point of the island, and then we were truly within Antarctic waters, with icebergs both to port and starboard.

Chinstrap penguins appeared, and a crabeater seal dozed on a floe. We sighted three killer whales, and felt that we were actually "there" at last.

Our group of tourists ranged in age from 23 to 86. Included were jaded travelers, interested amateurs, one or two knowledgeable housewives, some scientists, an astronomer, a clutch of bird people, and a small staff of Naval personnel to knead

this collection into a coterie of Antarctic buffs.

There were as many reasons for being there as there were passengers on board. I lifted my glass of good local Chablis to the Argentine Navy for its magnificent direction, diplomacy and even temper under novel, and often trying, conditions.

For 10 days, we cruised in these waters — down the Bransfield Strait, through the narrow and very beautiful Neumayer Channel (on which day we had our only sunshine of the trip) and to within a respectable distance of the Antarctic Circle.

Pack ice prevented our going farther south. And so, in the middle of the night, accompanied always by our little escort tug, we reversed course and scurried up de Gerlache Strait to the top of the Antarctic Peninsula and to Esperanza, the Argentine base there.

We crossed to King George, Livingston and Deception Islands in the South Shetlands, going ashore to visit eight scientific bases, penguin and seal rookeries and geologically interesting formations. It was a feast of new information and constant stimulation for most on board.

We learned how to take bottom samples from the sea and to examine plankton hauls under the microscope. We acquired sure footing, disembarking onto shingle

beaches from a small boat. We scrutinized beautiful fossil plants from the Jurassic period. We were taught the art of abandoning ship in water of 30 degrees Fahrenheit.

We watched the distant pack ice move with the wind, and the icebergs move on an opposite current. We spoiled the morning nap of a bull sea elephant, and were fascinated to see him defend his family. We learned to recognize a penguin rookery from far off by an odor akin to that of a vast barnyard of chickens feeding on fish.

We photographed Wedell seals — the babies a lovely French gray and the adults scarred from internecine warfare. We disputed a segment of beach with a vicious sea leopard, and we spent hours watching an albatross, who spent hours watching us.

At Hope Bay (Esperanza), a historic British and Argentine base on the mainland, we spent a fascinating morning. A tenuous time schedule ashore was our lot there, as the Comandante Irigoyen, two miles away, anxiously watched the pack ice for any change in wind direction. For vessels of fairly limited power, Hope Bay can be a cul de sac.

We were greeted, at a modern steel dock, by the base complement of scientists, officers and men, who showed us the scientific work in

American Woman, 86, Takes Antarctic Tour

By The Associated Press

BUENOS AIRES. Jan. 30

Mrs. Essie C. Sweeney likes to travel and so far the pack ice and perilous seas of the Antarctic haven't bothered the 86-year-old lady from Washington.

"She is not missing anything, including shore visits," said a radiogram received yesterday from the La Pataia, first cruise ship ever to sail to the bottom of the world.

Mrs. Sweeney is one of 44 tourists aboard the ship and is believed to be the oldest woman ever to penetrate an area generally considered the domain of the toughest and most highly trained explorers.

La Pataia, a 6,000-ton converted Argentine troop ship, was battling a howling wind and heavy seas yesterday on the way north to Deception Island, a speck of land 550 miles south of Cape Horn.

Incidentally, the weather is much warmer on Deception Island than in Washington or New York. The Argentine weather bureau reported temperatures on the island reaching up to 39.2 F.—about 23 degrees above the average temperature in Washington yesterday.

For the last week the tourists have been cruising the Weddell Sea getting as far as 66 degrees 20 minutes south latitude before ice packs forced them to turn back.

Conditions outside may have been rough, but messages from the ship said the passengers were amusing themselves with champagne parties, dinners and birthday celebrations. Not to mention shore excursions.

These were quite unlike the usual tour: The only quaint natives the sightseers met were the penguins.

"We anchored off Groussac Station," radioed Lars-Eric Lindblad of 1 East 53d St., New York, who organized the cruise, "where we spent the evening ashore visiting extensive penguin rookeries. We saw many chicks and penguin eggs."

"The passengers had a wonderful time picking up penguins, photographing them and had tobogganing parties on the snow covered hills."

Mrs. Sweeney and the rest of the passengers also visited the United States Naval transport Wyandot, the U. S. Coast Guard icebreaker East Wind and the Argentine transport Irigoyen.

At least one passenger made an impression on the Argentine officers — Miss Christine Aracciglio of Italy who is traveling with her aunt, Mrs. Rose Zalles, of Washington.

When she celebrated her 23d birthday at a champagne party given by Capt. Orland R. Perez Cobo, officers from the Irigoyen transferred ship to bring her a tiered cake.

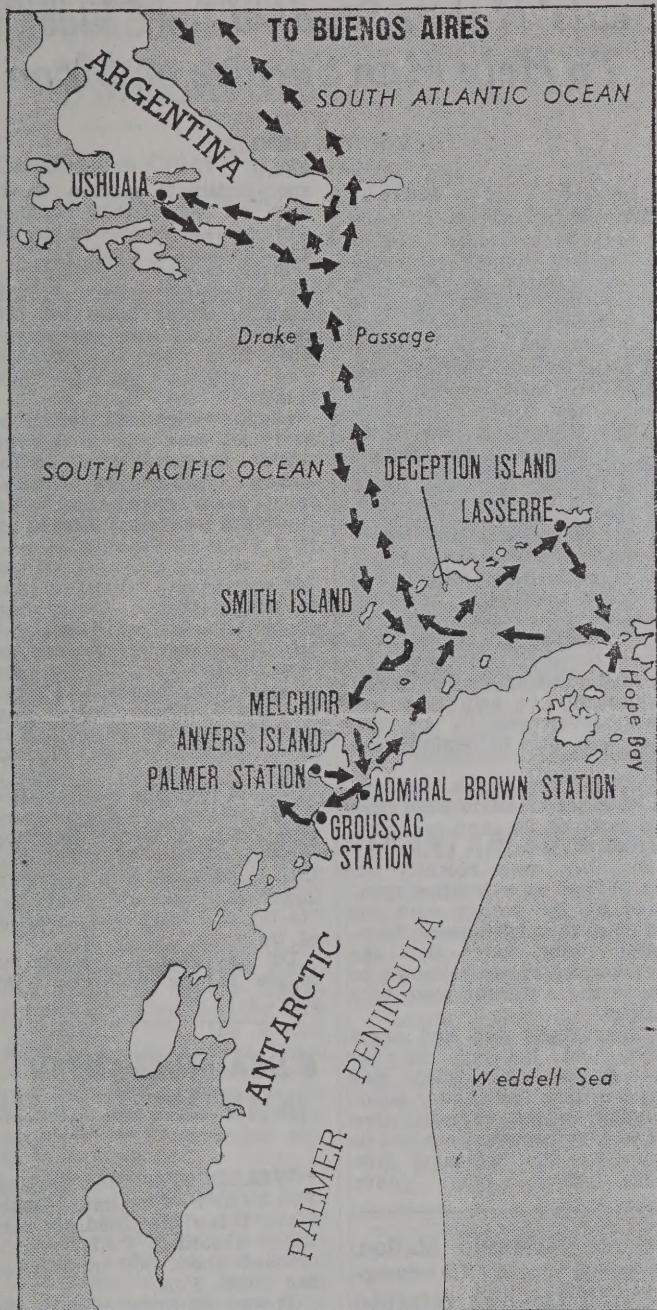
Chief vacation attraction of the Antarctic is the fantasy-land scenery. The passenger thrills to one entrancing sight after another as the ship makes its way cautiously south between Palmer peninsula and the towering rock mountain islands and vast vistas of floating icebergs, ice tables and fields of smaller ice floes along the western coast.

Between the mountain peaks, on mainland and islands, are ice fields and glaciers, pressing forever to the shore, there to break off in huge "cathedrals" of pure white. These frequently are streaked with veins of beautiful indigo blue.

Another tourist attraction is the penguins. Oddest of all birds, they strut like stuffed shirts dressed for a formal occasion. There are birds other than the flightless penguins.

There are seals — Weddell Sea, Leopard, and Elephant varieties. There are blue whales, largest animal ever to have lived on earth; and the smaller but more vicious killer whale.

All Antarctic animal and bird life is of water habitat. The continent supports no life.



progress. We also went on an exhilarating dog-team junket, examined newborn huskies, and fruitlessly hunted for fossils in outcroppings covered with four inches of new snow.

We were served coffee with cognac at 10 A.M., we wandered among moulting Adelie penguins, and we sat for a while watching dive-bombing skua gulls. We looked at the deceptively peaceful landscape of glacier and snow, black rock and green-gray seas and a multitude of fanciful icebergs. It was a rare moment.

We were lectured on the history of Antarctic explorations, and we saw films on these, the richest waters in

Chicago Tribune the world. At gala dinners aboard ship, we tangoed until 4 in the morning. We also learned a great deal of Spanish. "We" became an entity.

As a finale, we did have that storm that we had missed on the first crossing of Drake Passage. Huge, jumbled seas passed astern, and we had a stand-up lunch of sandwiches and apples—all that the galley could manage.

The furniture broke loose from its moorings and careered from port to starboard and back. The wastebasket glissaded gracefully across the room, out the door, up and down the passageway, and precisely back to home base. Unsteady passengers

ANTARCTIC LIFESAVERS

THE Para-Rescue team of the Navy's Air Development Squadron Six (VX-6) at McMurdo Station, Antarctica, has a tough job. Its mission is to find aircraft accident survivors and get both the survivors and themselves back alive.

The team came into being because much of today's exploration on the seventh continent is done by air. Forced landings, although rare, do occur, and survival chances on the barren desert of snow and ice are slim. The team members are qualified parachutists who earned their wings after 10 jumps at Lakehurst, or in Antarctica itself.

In further preparation for the rugged requirements of their chosen career, seven members of the team recently graduated from a survival school whose campus was the enemy itself—the face of the antarctic.

EVEN for an experienced climber, the terrain is wicked. There are many jagged mountains. Some jut out to over 16,000 feet. On flat ice plateaus wide crevasses appear, often hidden by a thin bridge of snow. The plastic ice flows slowly along and heaves up at pressure points to form ice barriers which deny passage to all but a well-trained and equipped party.

With these obstacles in mind, the school concentrated on some of the finer points of mountaineering. The first two days of the course were spent relatively close to McMurdo Station, hub of the U.S. Navy's Operation "Deep Freeze." The team members were taught various techniques of ice and snow climbing. The classes include walking on ice-slicked slopes, climbing snow covered mountains, singly and in pairs, and building snow houses.

The team learned how to cut snow and ice steps and use crampons and pitons to

scale steep ice slopes. They studied two-men-on-a-line traversing and its objective, belaying (stopping the fall of a partner).

Rapelling, the art of swinging down into a crevasse to rescue a man taken unawares by a snow bridge, and making one and two-man prussic loops to get him out were also part of the course.

THE temperature for the first two days hovered around the relatively warm 15-degree (Fahrenheit) mark, but the mercury suddenly took a drop of 40 degrees below zero when the team and their New Zealand instructors were ready to take off into an uncharted area of the antarctic to test their newly acquired skills.

Their mission was to find a supposedly downed aircraft somewhere on the treacherous slopes of Mt. Erebus, the only known active volcano on the frozen continent. The 10 men hiked up the tongue of a glacier lined with crevasses, struggling against snow-filled 40 m.p.h. winds. It took the rescue party four hours to cover the five miles between their starting point and the mythical aircraft wreckage.

Upon arriving at the "crash site," everyone started making ready for the night, cutting and fitting snow blocks into two igloos and cooking the survival rations they carried in their 40-pound packs.

It took four hours to build the crude igloos and melt enough snow to cook their food. After eating, the members of the party rolled up in their sleeping bags in the cramped igloos and slept for 14 hours.

ON the next day, the welcome roar of a VX-6 helicopter brought to a close their adventure on the ice. The aircraft took the party

Seals' Habits Studied for Clues To Help Man Survive on Moon

By JOHN C. DEVLIN

The New York Times

March 13

When man lands on the moon he may be armed with information now coming from scientific research in Antarctic seas, especially with regard to the extremes of cold and lack of oxygen that can be endured.

Dr. Carleton Ray of the New York Zoological Society, back from a new study of the Antarctic and its seals, said there were many unanswered puzzles that natural science studies might answer.

Of pertinent interest are the reasons why seals can endure tremendous cold, sleep under water without breathing and use what appears to be a remarkable echo-sounding system for navigating in total darkness under thick ice to return to isolated breathing holes needed sporadically to help them remain submerged in a state somewhat akin to semihibernation.

"All we know so far," he said, "is that seals can do what man can not yet do—and we want to find out why."

Dr. Ray, who recently returned from an expedition sponsored by the society with the aid of a National Science Foundation grant, noted that the four species of seals known to live in the Antarctic were very curious.

"They really yell and make hoots and hollers," he explained, "and we think this may be their underwater echo-sounding system of navigation not only to communicate but to return to the breathing hole which they must have

sporadically to survive, as did men on submarines equipped with snorkle devices in the old days to obtain fresh air."

When frigid winds blow hard, he continued, the seals slip into their breathing holes for protection from the blasts but poke their noses out on occasion without getting them frozen.

His investigations, which he continues each year in the Antarctic, are carried out in the Antarctic summer by observations made from aboard the American icebreaker *Burton Island* and a helicopter.

He said his basic job was to "go back to natural history" and to study not only the relatively well-known Weddell seal, but also the crabeater, the spotted leopard and the Ross species of seals in such areas as Franklin Island, Capes Adare and Hallett, Coulman Island and in many other poorly charted areas.

He said the seals were relatively indifferent to the helicopter's noise. It would land him relatively close to them and then move away while he took underwater sound recordings "to try and learn the language of the seals."

Dr. Ray said he intended to return to the Antarctic next year.

6 DEAD IDENTIFIED IN ANTARCTIC CRASH

WELLINGTON, New Zealand, Feb. 3 (AP)—The United States Navy today identified six men killed aboard a C-47 when it crashed about 800 miles from the South Pole.

It was the worst crash of the Navy's 11-year Operation Deepfreeze in the Antarctic.

A second C-47 spotted the wreckage on the Ross Ice Shelf, where the first plane was landing to pick up a field party when it crashed. The site is near the old Little America site 400 miles east of McMurdo Station, the main United States base in the Antarctic.

The Navy said the victims and their next of kin were:

Lieut. Harold M. Morris, pilot, husband of Patricia Morris, South Logan, Utah.
Lieut. William D. Fordell, co-pilot, son of Mrs. Elsie Aline Fordell, Coos Bay, Ore.
Lieut. Comdr. Ronald Rosenthal, navigator, son of Ronald Rosenthal, 89 Metropolitan Oval, New York City.
Petty Officer I.C. Richard F. Simmons, husband of Sandra Darynn Simmons, Corpus Christi, Tex.
Petty Officer I.C. Wayne M. Shattuck, husband of Sharon Lee Shattuck, Bridgeport, Conn.
Petty Officer I.C. Charles C. Kelly, husband of Shirley Jean Kelly, Newport, Tenn.

All six men were members of the Navy's Air Development VX6 Squadron.

back to McMurdo Station, 35 miles from the campsite, and the men returned to their regular assignments of providing support for science.

At the class critique later, the comments ranged from "never again," to "the experience of my career." Everyone agreed, though, that this training, tough as it was, is mandatory to insure the success of the Para-Rescue team's mission.

And thanks to the generosity and experience of the New Zealanders and the determination of the VX-6 men, scientists can scatter over the icy continent with more confidence in their safety.

EXPLORER, AT 78, IS STILL ACTIVE

Canadian in Great Demand
for His Wide Experience

VICTORIA, B. C. (Canadian Press) — Only one man bridges the gap between the heroic explorers of the Antarctic half a century ago and a new team working there now.

He is Sir Charles Wright, 78 years old, whose latest, but not necessarily last, career is in an office at the dockyard here.

Sir Charles recently returned from his fourth Antarctic trip in the last five years. Few men are as familiar as he is with the frozen continent.

His name is linked to the expeditions of Capt. Robert Falcon Scott, and it was a party headed by Sir Charles that spotted the green top of Captain Scott's tent during the search for the lost explorer in 1913.

Sir Charles dug through the snow under which the tent was buried, and retrieved the journal that Captain Scott had prepared as he awaited death. The journal revealed that Captain Scott had reached the South Pole, although a month later than Roald Amundsen, the Norwegian explorer.

During World War I, Sir Charles served with the Royal Engineers and British intelligence. Service between the wars in research with the British Admiralty, heading the Royal Naval Scientific Service, equipped him for a wartime job directing 600 scientists looking for ways to defend against new German weapons.

He retired officially in 1947 and went to live in West Vancouver, but soon joined the British Columbia Research Council. Later he was called to Washington to help keep Americans informed about British scientific advances.

Three more years of retirement, this time in Victoria, were followed by another term in Washington. Sir Charles "retired" a third time until a chance to study disturbances in the earth's magnetic field took him back to the Antarctic. This was a cooperative program uniting the Pacific Naval Laboratory here, the University of British Columbia and Stanford University, in California.

Sir Charles now is considering retirement again — but he said there is "much to be done" before he takes the final step.

Fish Inhabit Antarctic Waters

Approximately 128 species of fish inhabit Antarctic waters, the National Geographic says. They are characterized by large heads and small bodies.



Members of the Antarctic observation team and crewmen of the icebreaker Fuji are welcomed home in a ceremony held at the Harumi pier, Tokyo, where the ship docked

SOVIET MOON TESTS IN ANTARCTIC HINTED

MOSCOW, April 28—A Russian scientist hinted today that the Soviet Union planned to use the Antarctic as a testing ground for manned landings on the moon.

Leonid I. Dubrovin, speaking by radio from the Soviet Union's Antarctic station at Mirny, said that scientists could learn much in the Antarctic that would help man to survive in the desolate conditions on the moon.

Mr. Dubrovin, who is the head of the current Antarctic expedition, the 11th, was taking part in a news conference conducted by radio between Mirny and a hall in the Teachers Club in downtown Moscow.

The fierce conditions in the Antarctic test the ultimate limits of man's ability to adapt and survive, the scientist said. For example, he reported, the temperature today at the Soviet Union's Vostok station in Antarctica was 103 degrees below zero Fahrenheit.

The Vostok station is 875 miles inland at an altitude of more than 11,000 feet.

Rocket to Rise in Antarctic

MELBOURNE, Australia, Jan. 4 (AP)—France will become next year the first country to launch a rocket into space from the Antarctic, the director of French polar expedition organizations, Paul Emile Victor, said today. A launching ramp is being built in French Antarctic territory in Adele Land, he said.

Fuji Welcomed Back Home

Government officials and families of the crew welcomed the return of icebreaker Fuji as the ship docked at Harumi Pier in Tokyo April 3.

Among some 400 people on hand were Education Minister Umekichi Nakamura, Defense Agency Director Raizo Matsuno and Shinichiro Tomonaga, president of the Science Council of Japan.

The 7,760-ton ship sailed into the port at about 9 a.m. Friday as people ashore wave and 10 helicopters hovered above.

The icebreaker and its 182-man crew had just completed a

140-day expedition mission to the Antarctic which included the reopening of Japan's Showa Base for the first time in four years and seven months and unloading of a wintering team and equipment weighing some 400 tons.

Minister Nakamura heads the headquarters of the Japanese Antarctic expedition.

The Fuji started its long journey home Feb. 13, leaving an 18-member wintering team at the Showa Base.

The ship will undergo repairs before it leaves again for the Antarctic next fall.

South African Weather Base Sited on Island by Copter

CAPETOWN, South Africa (AP)—Dr. Wilhelm Verwoerd, geologist and eldest son of South Africa's Prime Minister, Dr. Hendrik Verwoerd, was lowered from a helicopter to hammer in a beacon on the second highest peak of lonely Bouvet Island in the South Atlantic.

He was a member of a South African expedition dispatched to the Norwegian-owned island to see if a weather base could be established there. The expedition found two suitable sites. Dr. Verwoerd was winched down from a helicopter to the top of the 2,340-foot summit of Lykke Peak to put up a survey beacon. He spent about five minutes dangling on the 20-foot rope from the craft.

Norway has agreed to permit

South Africa to build the weather station on the island which is 1,400 miles southwest of the Cape of Good Hope.

Soviets Exceed Whaling Quota

Tokyo, April 12 (Reuters)—Russia exceeded its agreed quota during the Antarctic whaling season just ended, the Japan Fisheries Agency said today. The agency said the Soviet Union caught 920 whales—exceeding its quota by 2%. Local whaling sources said this was a possible expression of Soviet dissatisfaction with the national quota agreement started in 1962.

Glaciers cover about one-tenth of the earth's land surface and contain almost one per cent of the world's water.

MUSEUM PLANNING A 92-FOOT WHALE

New Model to Replace One
That Has Been Up 60 Years

A 92-foot model of a blue whale, the largest creature known to inhabit the earth, is being designed for a new Hall of Ocean Life at the American Museum of Natural History.

The model will be hollow and made of various types of plastic covering a frame of steel and aluminum. It is expected to be ready by the end of next year.

The hall, however, probably will not be opened until 1969 because of the time needed to construct and install other exhibits.

The new model will take the place of the 76-foot model of a sulphur-bottom whale that has been hanging on wires in the museum since 1906.

When the new hall opens, the old model may be moved in with the new whale if there is enough room in the hall, which is 113 feet 8 inches long and 48 feet 9 inches high.

If this is not possible, the old model will be cut up and junked or taken apart in sections and placed in some other museum. It is too big to move out of the museum in one piece.

The cost of the new model is not yet known. The whale will be shown making a dive as from an ocean surface, with its head about six or eight feet above the floor. The 10-to-20-ton exhibit will be attached to the ceiling at the arched part of the back.

The new whale is a copy of ones at the British Museum and the Smithsonian Institution in Washington.

Construction details are being worked out by Gordon Reekie, chairman of the Department of Exhibition, and Lyle Barton, new head of the museum exhibition's department.

Scientists Studying Seals' 'Talk'

Washington

Two New York Zoological Society observers who sat in on the "conversations" of Antarctic seals are hard at work to determine whether seals talk under water.

Supported by the National Science Foundation, the study was made from a specially constructed chamber

Argentines turn out for Antarctic heroes

By Norman Ingrey

The Christian Science Monitor

Buenos Aires

Mid-February was a memorable period for those Argentines who are bent on promoting Argentina's heritage and opportunity in Antarctica.

A hero's welcome was accorded members of the first Argentine overland expedition to the South Pole.

There was the return here, too, of the first foreign-tourist venture, including 44 North American tourists, to antarctic regions. And the Minister of Defense set out with a political and press party to visit Ushuaia and Argentine bases farther south.

The reception for Col. Jorge Leal and his Army patrol which reached the South Pole was, naturally, a spontaneous one. It was also a big one, even for Buenos Aires.

The newspapers and broadcasting stations extracted their own "copy" from the foreign tourists seeking and finding a change from the conventional cruise. Travel promoters also discerned future openings here.

Significance accented

But when all the celebrations are over, including the reports brought back by the ministerial party, the message will be clear and increasingly stressed. It is one attractively set forth and more urgent than before:

"Go south, adventurous young man!" Not necessarily to the haunts of the penguins and icebergs, where the tourists went, and where the armed forces have several bases to discharge their guardian role. But at least to the great Patagonian plateau where mining and manufacturing now are being mixed with sheep-farming and fruit growing.

That is what officials are saying today. It

is also behind the rejoicing over the successful South Pole expedition and the publicity given the antarctic tourist party.

The significance of Colonel Leal's military expedition could easily be overlooked. In these days of almost routine flying and dropping of flags over both poles one is apt to forget that the task of reaching either by surface route remains as challenging and almost as hazardous as in the year before mechanical transport and radio.

The Leal expedition had a 46-day trek over the ice wastes after it left the bases. The only resources that counted for this were those of human endurance and enterprise. Argentines are happy to reflect there is no lack of these qualities in the national stock. They are also proud the fact has been exhibited in this epic form.

Incentive viewed

The accomplishment is being accepted as an incentive to government and people as they look southward for national advancement.

Stress continues on the need for peopling Patagonia, where the climate is stern but not so forbidding as farther south.

Tourist cruises into the antarctic and even an Argentine conquest of the South Pole alone will not achieve this. To some extent the authorities are being caught up and tripped with their own publicity. Regional economic planning, they are told, is imperative to keep pace with the example set and imagination stirred by this South Polar expedition.

Another comment has been that it would be better to attract youth to the far south than to let the young men go to the too-far north — the United States, presumably — where their inestimable assets are liable to be lost to their own country.

Antarctic base needed

By the Associated Press

Southampton, England

Britain's Halley Bay base station in the Antarctic, established in 1956, is sinking

and must be replaced. This was reported by Sir Vivian Fuchs, director of the British Antarctic survey, after he met 16 technicians on their return from there in the Danish polar vessel Kista Dan. He estimated the new station would cost \$280,000.

beneath the ice. The object was to record sounds made by the seals in their home life. The scientists brought back nearly 50 yards of tape recordings to study and analyze.

Recently there has been a debate over whether seals "talked" or made any other sounds under water. In a report issued through the Woods Hole Oceanographic Institute in Woods Hole,

Mass., the scientists say this now has been clearly demonstrated.

The chamber, constructed to a Woods Hole design, permitted underwater observation by the hour instead of by the minute as in the past. The job of analyzing the recordings is expected to take at least a year.

The animals observed were Weddell seals, who spend most of their lives under the Antarctic icecap.

Deepfreezeville

Allyn Baum, a staff photographer and special writer on the *New York Times*, was assigned as correspondent in the Antarctic on two consecutive expeditions. He is author of "Antarctica: The Worst Place in the World" (Macmillan. Illustrated. 151 pages. \$3.95).

His book deals with the scientific side of polar exploration but also with lighter activities such as the "I Hate Penguins Association" and the South Pole Bowl Game of touch football.

Whaling Nations to Seek a Pact



United Press International

A helicopter ranging out from a Soviet whaling fleet in Antarctica to search for whales

By JOSEPH LELYVELD
The New York Times

LONDON, June 26 — The major whaling nations will get together here tomorrow to see if they can strengthen the agreement they made last year to conserve Antarctic whale stocks.

The agreement was to reduce the catch by about one-third. It came at a time when the whaling industry seemed bent on using up the whales as fast as possible. But it was only a first step; it did not guarantee the long-range goal of conservation.

The agreement specified the catch for one year only. Moreover, the reduced level it set was still well above what oceanographers calculate to be the "sustainable yield"—that is, the maximum catch that can be made without endangering the future of the stocks.

A further reduction is envisioned for the coming year, but it probably will not be until 1967-68 that the catch finally drops below the "sustainable yield."

Actually, of the 16 nations that are expected to attend the annual meeting of the In-

ternational Whaling Commission, only three—Japan, the Soviet Union and Norway—still send fleets to the Antarctic. The others work mainly in the North Pacific, or from land stations along their own coasts.

The mechanism of control is rather finely put together for such a hefty beast. The whaling fleets are required to make daily radio reports on what they have taken to the Bureau of International Whaling Statistics at Sandefjord, Norway, which then is able to keep a day-to-day tabulation of the catch.

The catch is measured in what is called a "blue whale unit." One blue whale equals two fin whales, or six sei whales, or two-and-a-half humpback whales. Fin and sei whales account for more than 90 per cent of the Antarctic catch.

The ceiling established by last year's agreement—4,500 blue whale units—apparently has been observed. The alarmingly high catches in the two preceding years amounted to 6,986 and 8,429 units, respectively. In other words, the annual catch was nearly halved in three years.

The catch in the less significant North Pacific whaling regions is also running well above

what the oceanographers say is the safe rate from the standpoint of conservation. But no restrictions were imposed last year.

Another leftover issue that will occupy this year's conference is that of establishing an international observers' system to police the agreement. A plan for such a scheme was adopted by the convention but shelved after the Soviet Union refused to promise its cooperation. The Soviet objection was that the scheme was too narrowly drawn, leaving out policing of land stations and factory ships.

The future of the sperm whale has also become a major cause for concern, which has probably heightened since the last meeting. The reason is that restrictions on other sorts of whaling can serve to increase interest in sperm whaling.

Until now, the attempt to conserve sperm whales has taken the form of a prohibition on catching female sperm whales smaller than 38 feet long. But this has apparently not been sufficient, possibly because the prohibition has been ignored.

Although these problems continue to trouble the experts, it still appears that the cause of conservation is gaining momentum among the whaling nations.

WHALES REPORTED NEAR TO EXTINCTION

JOHANNESBURG, South Africa (AP)—There is growing evidence that the sea is running out of whales, according to reports reaching here from Cape Town.

This seems to be especially so around the hitherto rich catching grounds of the tempestuous Antarctic seas.

Japanese whaling fleets will not be returning next season.

The Japanese quit whaling this season after operating their modern fleets for only three of the normal five months because of the absence of whales.

Catchers searched thousands of square miles of the Antarctic, but made such a small haul that they returned to base, losing thousands of dollars in the process.

It is open knowledge among fleet owners that each season brings these large mammals closer to extinction—and the possible end of the industry.

Leith harbor, on the fringe of the Antarctic, was for many years a prosperous base of British operators. A factory there, which turned out thousands of tons of whale oil and by-products, is now likely to be abandoned.

Whaler Returns From Antarctic

April 9

KOBE—The 19,319-ton factory ship of the Nippon Suisan K.K.'s Tonan Maru flotilla Friday returned here from an Antarctic whaling expedition with 3,289 tons of whale meat, whale oil and other products aboard.

The Tonan Maru, with a crew of 311, left Kobe Port six months ago for whaling operations in Antarctic waters.

The fleet hunted sperm whales from early last November and then competed with Norwegian and Russian fleets for baleen whales from Dec. 12.

By March 5, the Japanese fleet caught its quota of 377 in terms of blue whale units. From the catch, the fleet produced 6,458 tons of whale oil, 19,216 tons of frozen meat, 940 tons of salted meat and 30 tons of other products for a grand total of 39,000 tons.

Space Temperatures Studied

WASHINGTON, May 3 (AP)

—The National Aeronautics and Space Administration said today that sounding rockets were launched within a five-hour period last Sunday from four widely separated sites. The purpose was a coordinated study of winds and temperatures from 25 to 60 miles above the earth. The Nike-Cajun rockets were sent up from Wallops Island, Va.; Fort Churchill, Canada; Point Barrow, Alaska, and Natal, Brazil.

An Excellent Book On Antarctica

SOUTH: *Man and Nature in Antarctica.* By Graham Billing and Guy Mannerling. 207 pages. 9x11½ inches. University of Washington Press. \$15.

A FEELING of nostalgia comes over one who has been to the Great White Continent upon leafing through this fine book of photographs of Antarctica and its inhabitants, both wild and human. With only 86 pages of text and 207 pictures, of which 55 are in color, this tome certainly can be compared mainly on the basis of its pictures with other recent books on the polar regions.

The photographs are very good and are typical of the normal life and topography of Antarctica. The color pictures are of excellent quality, though some lose impact because subjects are duplicated or because fine details are lost in the printing. Although I am undoubtedly biased as a biologist, it seems a fair criticism to note that not a single picture is found of over 50 species of mosses and liverworts native to the continent, and although there are probably 300 or more species of lichens only one picture vaguely shows some in the background.

Birds, Seals Scenery

As the cold inhibits the spread of flowering plants to Antarctica—there are but two species, a grass and a wild pink—it would seem better to have included some of this missing biota and forego some of the pictures of dogs and other exotic animals. Birds receive much better treatment, with seventeen pictures of

the Adelie and emperor penguins, skua and snow petrel, and a chapter of text. Seals also fare well, but the magnificent marine invertebrates receive short shrift. Snow, ice, geological features, man and his machines are well represented in both text and photographs.

The text contains a mine of interesting information, such as: The lowest temperature ever recorded on earth was minus 128.9 (Fahrenheit) at the Rus-

sian base known as the Pole of Inaccessibility. Antarctica has only about an equivalent of 6 inches of water—in the form of snow; it rarely rains there. Over 90 per cent of all the ice on this planet is in Antarctica, which undoubtedly is the reason that it is the only continent without any native land mammals or humans.

The book can thus be summed up as having many good photographs, and a text on the whole

well written; its initial chapter, however, loses the reader by taking up detailed place names without first giving a broad outline of the continent as a whole. The only recent book which I can find that compares favorably with this one is "The Poles," in the Life Nature Library.

ELMER G. WORTHLEY.
Dr. Worthley was senior biologist of the United States' Project Deep Freeze several years ago. *Baltimore Sun*



Surveyors on Mount Newall in the McMurdo Oasis of Antarctica. This is one of the photographs in "South."

ARCTIC FORECAST: EXCEPTIONAL ICE

Severe Conditions to Affect U.S. and Soviet Shipping

June 27

Summer operations of United States and Soviet Union shipping in Arctic waters off Greenland and along the Siberian coast are expected to be affected by abnormally severe ice conditions.

Coast Guard sources said last week, in connection with the start of the 15th annual resupply mission of northern military bases by the Navy's Military Sea Transportation Service, that very severe icing was ex-

pected this summer in the Baffin Bay area.

A Coast Guard spokesman added that the two Coast Guard icebreakers, the Westwind and the Edisto, assigned to this year's resupply task force, "will have their work cut out for them."

The Russians, too, expect tough going in their shipping operations along the Siberian coast.

Novosti Press Agency has quoted Aleksandr Afanasyev, head of the Chief Navigation Board and collegium member of the Soviet Ministry of Merchant Marine, as saying that this year "our polar explorers and sailors will be confronted with a serious trial which the severe climate of the polar basin has in store for them."

According to forecasts made by the Arctic and Antarctic Scientific Research Institute, ice conditions in the polar seas

will "now be more difficult than last year on account of the thickness of ice, which exceeds average figures," Mr. Afanasyev said.

Mr. Afanasyev added that in the forthcoming Arctic navigation season traffic was expected to grow 28 per cent over last year's volume. However, no data on Soviet Arctic cargo movements in 1965 were made available.

This increase, Mr. Afanasyev explained, was prompted by the rapid economic growth in the northern Soviet district—the Magadan region, Chukotka, the Krasnoyarsk Territory and the Tyumen region. Primary cargoes, he added, include building materials, equipment for polar stations and industrial enterprises, automobiles, food, fuel and various goods for trading and servicing the northern regions.

By early next month, Mr. Afanasyev continued, powerful

icebreakers are expected to work in Yenisei Bay to allow the first convoys to enter Igarka where they are expected to take on timber.

Ice operations in the eastern Arctic waters are expected to get under way by the end of this week. The 9,427-gross ton Moskva, a Finnish-built vessel and one of the largest conventional icebreakers in the world, will help in the task.

By the end of July, the flagships of the icebreaking fleet, the atomic powered icebreaker Lenin and the 400-foot Kiev are scheduled to escort a convoy into the Laptev Sea. Difficulties are expected through the Boris Vilkitski Strait.

Projecting the future of shipping operations in the Arctic, Mr. Afanasyev said that "Arctic navigation is on the threshold of a very responsible period."

Fatal Accident at South Pole

On February 13, 1966, in the course of a routine operation, a member of the wintering-over party at South Pole Station was fatally injured. Andrew Burl Moulder, Jr., SK2, USN, was assisting in the unloading of an LC-130F aircraft when he was caught and crushed between the airplane and a cargo sled pushed by a tracked vehicle. Moulder was pronounced dead shortly after arrival at the station's dispensary.

United States Naval Support Force, Antarctica, Has New Address

As of May 1, 1966, the Commander, U. S. Naval Support Force, Antarctica, moved his office from Temporary Building D on Independence Avenue, S.W., to the United States Navy Yard, also in Washington, D.C. Mail should be addressed as follows:

U. S. Naval Support Force, Antarctica
Building 210, Washington Navy Yard
Washington, D. C. 20390

Division names and code numbers remain unchanged and should be used as appropriate.

Robert Oliver Derrick Dies

Robert O. Derrick, U.S. Weather Bureau, died April 11, 1966, from a heart attack. Forty-five years old, he had been associated with arctic and antarctic activities for the past 18 years.

As an employee of the Arctic Operations Project in the Weather Bureau, he served in various capacities at the weather stations at Thule, Eureka, and Resolute Bay during 1948-1952. From 1960 to 1966, the services of Mr. Derrick were loaned by the U.S. Weather Bureau to the National Science Foundation to assist with United States Antarctic Research Program activities at Christchurch, New Zealand. As assistant to Mr. Edward Goodale, the Christchurch USARP Representative, he came in close contact with both United States and New Zealand scientists as well as personnel of *Operation Deep Freeze*.

In the words of Ed Goodale, "Bob Derrick will be greatly missed by those who knew him well, especially for his keen sense of humor and abundant good nature at all times."

D. I. SHCHERBAKOV GEOLOGIST, DEAD

Leading Soviet Geographer
Awarded Order of Lenin

The New York Times

MOSCOW, May 26—Dmitry Ivanovich Shcherbakov, one of the Soviet Union's leading specialists in geology, geochemistry and geography, died here today after a long illness. He was 73 years old.

Professor Shcherbakov, who was a member of the Soviet Academy of Sciences, published more than 100 works, many of them devoted to the Soviet Union's Central Asian region. In 1956, he headed the Soviet delegation to a session of the International Geological Congress in Mexico.

The Soviet scientist was graduated from Simferopol University in 1922 and joined the staff of Leningrad University. He took part in many geological expeditions in the Urals, the Caucasus, the Pamirs and in the Far North. Professor Shcherbakov specialized in rare minerals and radioactive elements.

For his work, he was awarded the Order of Lenin, which is the country's highest honor, and other decorations, including the Karpinsky Gold Medal three years ago.

Professor Shcherbakov was the editor of *Priroda*, a popular-science magazine.

Expert on Antarctica

In 1956, Professor Shcherbakov, who was chairman of the Antarctic Research Council of the Soviet Academy of Sciences, wrote that Soviet scientists hoped to make a comprehensive inventory of the resources of Antarctica.

He said that Antarctic research would occupy an "important place" in the academy's program for the coming years. The goal, he asserted, was to prepare an accurate geological map of the Antarctic continent showing the distribution of minerals and the character of the ice cover.

The next year, writing in a Soviet technical journal as head of the academy's Geographical and Geological Institute, Professor Shcherbakov predicted that by the end of this century, man would use the earth's heat to produce electric power.

The Soviet newspaper, *Pravda*, in 1958, carried a summary of a report on Soviet International Geophysical Year investigations in the Antarctic that had been presented to the Soviet Academy of Sciences by Professor Shcherbakov. The report said that if the Antarctic was a continent its size was far smaller than formerly believed.

He predicted in 1959 that nonstop flights between Moscow and Mirny, the Soviet scientific station in Antarctica, would become a reality. Professor Shcherbakov also said at that time that the Pacific coast of the Antarctic continent was "rich in useful minerals."

PHILIP BENJAMIN, WRITER, DIES AT 43

Was a Reporter for Times—
Wrote Novel on Antarctic

April 19

Philip Robert Benjamin, a reporter for The New York Times for 12 years, died yesterday at St. Luke's Hospital after a short illness. Mr. Benjamin, who was also a novelist and a poet, underwent abdominal surgery on April 4. He was 43 years old and lived at 501 East 79th Street.

Mr. Benjamin, a gentle, witty man, had a newspaper career that carried him from the Antarctic to London and to the Deep South during the most troubled days of the integration crisis. The Antarctic was the locale of a novel he wrote, "Quick, Before It Melts."

As a reporter, he covered a wide range of news—politics, crime, animal features, business developments and accounts of foreign adventure.

When Mr. Benjamin's book was published in 1964, a reviewer of The New York Times called it "a whirling comedy on the world's largest canvas of abstract expressionism, Antarctica." He added: "The big cool sprawl will never be the same again."

The story was made into a motion picture, and for Mr. Benjamin a boyhood dream had been fulfilled. "I always hoped I could write something that Hollywood just had to have," he said on arriving in the film capital. "After all, for us in our age the crown of success, whether real or false, has to be Hollywood."

When Mr. Benjamin's publisher asked him to write another book, he left his newspaper job last November to fulfill his publishing contract.

"It was terribly difficult for me to leave," Mr. Benjamin said. "But I didn't want to be a one-novel author and besides, and happily, Random House was insisting."

Mr. Benjamin was born in Stamford, Conn., on Nov. 15, 1922, and spent his early childhood in Indianapolis. He attended elementary school there, then moved with his family to New York, where he attended Townsend Harris High School and City College.

He proved an avid reader. He frequently amazed his friends by reciting whole pages of novels from memory.

Mr. Benjamin had almost completed his second book, a satiric novel of Caribbean political intrigue and adventure, at the time of his sudden illness.

He is survived by his widow, the former Lois Regensburg, a senior editor and columnist for The Ladies Home Journal; two sons, Anthony Scott and Roger Van Blerkom; his parents, Mr. and Mrs. Victor Benjamin of Waltham, Mass., and a sister, Mrs. Waldo Fielding of Newton Centre, Mass.

Our Icebreakers Are Not Good Enough

by Captain Edwin A. McDonald,

U. S. Navy (Retired)

U. S. Naval Institute Proceedings, February 1966

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When viewed in the light of our strategic and scientific goals in the polar regions today, one may raise some serious questions about the adequacy of our icebreaker construction program. Although a new icebreaker has often been included in broad scope shipbuilding schedules, she has never survived beyond the preliminary stages of approval and financing. For one reason or another, a new icebreaker always has had to take a back seat to other items adjudged more important at the time.

U. S. Navy and U. S. Coast Guard representatives have frequently reported that there are insufficient icebreakers available to carry out the tasks required of them in the polar regions. The opening of the St. Lawrence Seaway and the emergence of Alaska as a state have greatly increased the requirements. The fact, too, that our seven Wind-class icebreakers are 20 years or more in age, well past the prescribed life of other comparative naval vessels, compounds the problems.

Recently the precarious state of our icebreaker availability was emphatically demonstrated when the USS *Edisto* (AGB-2), just returned from six months in the Antarctic, had to be despatched to the Arctic to evacuate 21 scientists and their equipment from a disintegrating ice island off the east coast of Greenland. The fact that the USS *Atka* (AGB-3), which originally had been sent to perform the job, had been seriously damaged by striking a rock in Boston Harbor on the way up, provided little solace to the crew of the *Edisto*.

Our icebreaker force, due mainly to the heavier commitments at Greenland and the Canadian Arctic is based as follows: the USS *Glacier*, USS *Edisto*, USS *Atka*, USCGC *Westwind*, and the USCGC *Eastwind*, on the East Coast; and the USS *Burton Island*, USS *Staten Island* and USCGC *Northwind* on the West Coast.

An improvement in this polar icebreaking force may soon be forthcoming. The recent decision to place all icebreakers under the Coast Guard instead of having icebreaking responsibilities shared by the Navy may be a step in the right direction. It is reasonable to expect that since the icebreakers will represent a relatively large share of the Coast Guard's commitments they will receive more attention. And, because they will be among the largest of all the Coast Guard's vessels, they will not have to compete against the construction of even larger or more sophisticated types as they have had to in the Navy.

If current reports in Washington are true, the Coast Guard is already envisioning an ice-

breaker powered by atomic energy. Long a gleam in its eye, the Coast Guard's first attempt, in 1958, in gaining the necessary approval for such a ship was fruitless. The House of Representatives Committee on Merchant Marine and Fisheries and the Senate Committee on Interstate and Foreign Commerce reported favorably on a bill to authorize construction of a nuclear-powered icebreaker for the Coast Guard but it was never enacted into law.

Icebreakers have progressed a long way from the early wooden polar vessels, which though heavily reinforced in most instances, were wall-sided so that the pressure of hundreds of tons of ice could bear directly against their hulls. The loss of the *Jeannette* in the Arctic Basin off Siberia in 1881, in which Lieutenant George W. De Long, U. S. Navy, and most of his crew afterward perished from starvation, provides a graphic example of this kind. Ships were crushed and lost in numerous other expeditions during the 19th century, or they became so helpless and immobile in the ice as to negate the purpose of their expeditions almost entirely.

The finding of personal items and equipment from the ill-fated *Jeannette* off the coast of Greenland resulted in the building of a special kind of ice-ship by Fridtjof Nansen of Norway. To test the validity of the Arctic currents suggested by such an action, he wanted a ship strong enough to withstand the tremendous ice pressures sure to be en-

countered in his proposed drift across the Arctic Basin.

Thus, Nansen's *Fram* was different. Her underwater portion was shaped to resemble the cross section of a cylinder or barrel. No outer protuberances would offer resistance to the ice. If great enough, the ice pressure, it was believed, would literally raise the ship out of the water much like a pea is forced out of a pod by pressure from the fingers. Encroaching ice would advance under the hull and expend its force against ice on the other side. That the ship was in every way successful was proved by her three-year drift from a location off the northern Russian coast, across the top of the world, to emerge finally free of the polar ice fields in the Atlantic Ocean on 13 August 1896.

The United States is a late comer in the field of polar icebreakers. Except for past, small, polar vessels like the Coast Guard's cutter *Bear*, and the *Northland* (PG-49), which did not have great power and relied on pushing heavy ice aside rather than riding up on it and breaking it by sheer weight, we had never before engaged in this kind of ship operation.

Our polar expedition ships, with the exception of Admiral Robert E. Peary's *Roosevelt*, consisted mainly of beefed-up sealers and whalers. These did not fight the ice, but bided their time to sail into areas that were temporarily clear of ice. Sometimes they were caught. Sometimes they were crushed.

World War II, however, provided the im-

Of the Coast Guard's four Wind-class icebreakers launched during World War II, only the USCGC *Eastwind* (WAGB-279) was not transferred for a period of time to the custodianship of the Soviet Union.



petus for us to take positive steps in polar icebreaking when it became apparent that we would have to afford protection to Greenland or have it fall under Nazi control. Congress authorized the construction of four Wind-class, or "deep-draft," icebreakers for use in the polar and sub-polar regions. Three of these icebreakers—originally named the *Northwind* (WAG-278), *Westwind* (WAG-281), and *Southwind* (WAG-280)—were transferred to the custodianship of the Soviet Union at their request, and Congress accordingly authorized funds to replace them.

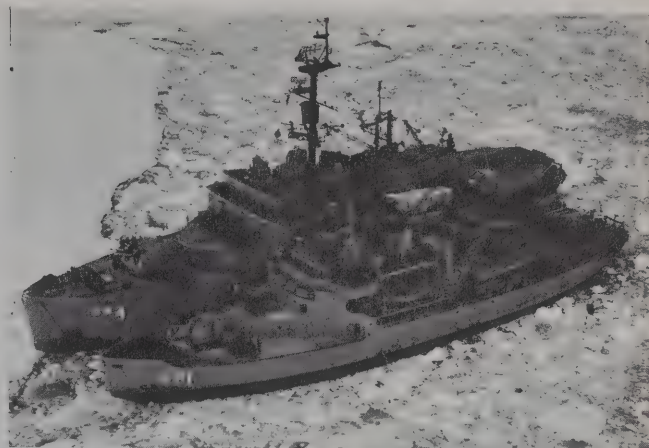
After the war, the Navy took control of the USS *Burton Island* (AG-88) and the USS *Edisto* (AG-89), and the Coast Guard assumed administration of the *Northwind*. In 1950 and 1951, with the return of the three icebreakers from the Soviet Union, the original *Westwind* reverted to the Coast Guard while the other two joined Navy ranks as the USS *Atka* (AGB-3) and the USS *Staten Island* (AGB-5). In 1955, the Navy built an additional icebreaker, the *Glacier* (AGB-4), of greater capability but with the same basic design features as the Wind-class icebreakers.

As our interests and responsibilities in both polar regions have increased greatly since World War II, the requirements for these icebreakers have likewise increased in these widely separated areas of differing configuration. Each has its own peculiar icebreaking problems. Eight thousand miles is the distance between the two operating zones, a voyage track further augmented by intervening ports of call and irregular land masses. Fortunately, the summer operating seasons, when optimum operating conditions prevail, are six months apart, but this leaves little time for winter operations or for badly needed overhauls or upkeeps. Icebreaking, with its repeated shocks, causes metal fatigue and heavy engine wear. Present-day operations involve long periods of time, a factor which tends to aggravate deterioration and hasten breakdowns.

In 1946-47, an expedition composed of 13 ships, known under the code name of HIGH JUMP, carried out extensive photo missions around the periphery of the Antarctic continent. The icebreakers *Northwind* and *Burton Island* broke ice for the central group of ships which had to transit a record 600-mile-thick ice belt in the Ross Sea. In the ensuing year, the *Burton Island* and the *Edisto* completed these operations by establishing controls *in situ* for charting.

Present Antarctic DEEP FREEZE Operations, which began with the support of the U. S. scientific effort in the International Geophysical Year of 1957-58, embrace an average of nine vessels each year of which four are icebreakers. With continued executive backing these operations will no doubt be a yearly requirement. The recent signing of an Antarctic Treaty, freezing claims and providing for the free exchange of scientific data between signatory nations (of which the Soviet Union is one) has been a stabilizing item in the gathering and studying of scientific information in south polar and sub-polar regions.

The 6,500-ton USS *Burton Island* (AGB-1) is dwarfed by the 8,640-ton USS *Glacier*. Among the several features which, in the author's opinion, make the *Glacier* superior to Wind-class icebreakers are her greater power and the improved engine and rudder control facilities within her hollow foremast at the aloft conning station.



In the Arctic, the establishment of a number of joint United States-Canadian weather stations at strategic locations established a requirement for icebreaker support. Construction of the Early Warning System, air fields, and scientific stations (during the 1957-58 IGY) have added to this, although the Canadian Government is now supplying a large portion of this support with added icebreakers.

It appears likely that there will be increased commercial activity along the ice-bound coasts of Alaska. Although mineral resources of the North American Arctic are only partially known, those that are may become valuable enough, due to a change in domestic reserves or curtailment of imports in an emergency, to render ship transportation feasible for their exploitation.

One of our icebreakers is already employed each season in a variety of jobs off the Alaskan coast, including native health care, law enforcement, marine safety, mail delivery, icebreaking, fisheries patrol, and other state and federal co-operative missions.

Except for nuclear-powered submarines, icebreakers are the only ships which can gather oceanographic data from controlled platforms within the polar packs. For this reason, their oceanographic work schedules are almost always more than they can fulfill at any one time. The amount of work that they can do in this category alone, if given the opportunity, almost defies description.

Miscellaneous tasks such as the rescue of ships entrapped in the ice, plane crashes in the polar seas, and possible atomic submarine failures in these areas may require assistance which because of the nature of circumstances can only be effected by an icebreaker or by icebreaker-based helicopters.

Because the Coast Guard is also engaged in ice clearance in the navigable waters of the continental United States in support of maritime commerce, an increase in the number of polar icebreakers would also lighten the workload of smaller icebreakers, especially in the event of unusually severe winters on the East Coast.

Fundamentally, it appears that the number of icebreakers should be such as to satisfy the following specific functions: (1) icebreak-

ing in support of domestic commerce; (2) icebreaking in support of military operations; (3) icebreaking in support of national scientific goals in the polar regions. Surely a hard, calculating look should be taken of the capabilities of our icebreakers in relation to the requirements generated by these functions.

The transfer from a conventional ship, particularly a lean, swift destroyer to an icebreaker is rather a startling one for a shiphandler. Heretofore, he has avoided all contact with solid objects such as floating ice or dead whales. Now, he finds himself suddenly confronted by a task requiring him to do just the opposite. Gone also is that feeling of lively responsiveness which allows a ship to dash here and there in a welter of foam. In its place is a sensation of ponderous, yet purposeful power. Pleasure and satisfaction come, not from "kicking up one's heels" when executing a "change of axis" in a screen formation, but from bludgeoning ice and outwitting it in its most threatening moods. It is a thrilling moment for a commander to see the results of his efforts at close hand.

The author, who has spent nearly 15 years in Arctic and Antarctic operations, mostly in the capacity of commanding officer, commodore, or observer aboard each of the Wind-class icebreakers, or the *Glacier*, or numerous ice-convoy ships and polar ships of other countries, has known this thrill and, as a result, has formed definite conclusions about our present icebreakers.

He believes that the diesel-electric driven Wind-class icebreakers were well conceived and of excellent design at the time of their construction. Besides having a round underwater body constructed of 1½ inch-thick high tensile strength steel, they included such innovations as a helicopter flight deck, an automatic heeling feature, where powerful pumps transfer water or liquid from one set of tanks to another in order to effect a rocking motion helpful in breaking the grip of ice, and an aloft conning station in the mast. The originally fitted forward motor and propeller assemblies were removed when polar operations showed them to be especially vulnerable in the varying ice concentrations of the polar regions.

The excellent visibility provided by their short forecastles and low freeboard is advantageous when maneuvering in the ice. Quick responses to power demands are made possible through linkage controller systems located within the pilot house and on each wing of the bridge. The exceptionally long cruising radius of the Wind class is well-appreciated insurance on long periods of isolated icebreaking.

Among Wind-class shortcomings, one must surely list the cramped living quarters and virtually non-existent scientific work spaces. In the open ocean their motion in a seaway is notoriously bad. During storms, frequent damage to boats, topside cargo, boat cradles, and other exposed equipment occurs because of the low freeboard and excessive rolling. A late modification in installing passive anti-roll tanks has, however, cut down the rolling to some extent. Lack of air-conditioning is sadly felt during transits through the tropics on voyages to and from the Antarctic. Inadequate hangar space often results in a high incidence of deterioration to helicopter frames and engines due to salt air and spray.

At the risk of incurring the wrath of Wind-class personnel who seem to be extraordinarily loyal whenever the larger *Glacier* is mentioned, it must be stated that her added power and space, improved engine and rudder control facilities within her hollow foremast at the aloft conning station, and permanent helicopter facilities make the *Glacier* a better icebreaker in almost every respect. Even with bent and broken propeller blades, the *Glacier* has been observed to break more ice than an undamaged Wind-class icebreaker.

Where the *Glacier* is particularly deficient, however, is in her cruising radius. She consumes as much as 25,000 gallons of fuel each

24 hours of full-power icebreaking as opposed to 10,000 gallons for the Wind-class. It was in large part for this reason that a decision was made to have the *Glacier* accompanied by a Wind-class icebreaker during the 1960 and 1961 Bellingshausen Sea explorations in the Antarctic.

Though the *Glacier* is an improvement on the Wind-class icebreakers, she, in turn, can be improved upon. Reference to the table below shows how our icebreakers compare to recent types of icebreakers built by the Soviet Union, Canada, and Argentina. It may be also interesting to note that our icebreaker tonnage stands behind the first two countries.

Most of the commanding officers of our icebreakers agree that we should have more space for embarked scientists in any new icebreakers. Work spaces, laboratories, and instrumentation should be provided for hydrography, meteorology, oceanography, marine biology, rocketry, ionic physics, and other geophysical studies. Balloon storage and launching areas with associated telemetering equipment are required. There should be a cold room laboratory for ice physics and monitoring apparatus for satellites.

And, if air-conditioning has not as yet been installed in U. S. icebreakers, neither have circuits which would make possible the cross-connection of any generator to an opposite main motor. This would be a particularly desirable feature in case of an emergency or breakdown.

Whereas any kind of icebreaker can perform most of the duties required—e.g., conveying and opening up a harbor—a particular exigency may demand a particular feature. Given these and other parameters, we want to ensure that we get the best icebreaker

possible for our investment. We surely want increased reliability, better performance, and longer cruising radius.

Our icebreakers have had a rather unfortunate history of propeller damage due to striking ice. Whether this is the result of over-initiative on the part of our icebreaker shiphandlers occasioned by necessary operations in severe ice conditions or because design criteria or construction materials are at fault is a moot question.

The apparent success of the special Superstone blades recently installed on the *Glacier* tends to indict both our present design and the strength of materials now in use. Year after year, the *Glacier* had bent or broken propeller blades in preparing the ship channel through McMurdo bay-ice in the Antarctic. Wind-class icebreakers have been almost as unlucky. The loss of icebreaking services during reinstallation of propellers can be critical as well as expensive.

The new propellers, while being cast of a stronger magnesium-nickel-aluminum bronze and 12 per cent chrome-stainless steel, are of approximately the same over-all dimensions, i.e. diameter, pitch, blade area, as the former ones. But the blade thickness ratio is about 1.5 times the original, and the leading edges are sharper for ice cutting. They are frequently referred to as "clubs." To date no deformation or breakage has occurred.

Many technicians argue that one-piece propellers should be used because of better strength and hub design—providing casting flaws inherent in large castings can be eliminated. No value accrues from separate bolted construction since propeller changes must always be accomplished in a drydock and the unit as a whole has to be balanced anyway.

The general rule of thumb about propellers is that three-bladed ones are more efficient and that each blade is stronger than four-bladed ones. However, a very efficient four-bladed propeller can be designed which would have the advantage of presenting smaller gaps between blades with less chance of the ice hanging up on the blades.

Another approach to the propeller-vulnerability problem is a redesign of our icebreaker stern underwater form to afford more protection to the propellers when the ship is backing down. The installation of hull baffles forward of the propellers or a shift to hydro-jet propulsion are others.

Perhaps the practice of fitting icebreakers with three shafts, one along the centerline and two at the wings, a feature long followed by the Russians and of late by the Canadians, is really a worthwhile answer in this regard. The only difference is in the application of power; the Soviets employ 50 per cent power to the center shaft and 25 per cent to each of the wing shafts, whereas the Canadians divide the total power equally in their ships. Its proponents claim the following advantages for the three-shaft installations:

- Reduced vulnerability of the centerline propeller due to its more advantageous centerline location.

RECENT ICEBREAKER TYPES

	Wind Class	D'Iberville	Kapitan Class	San Martin	Glacier	Lenin	MacDonald	Moskva Class
Country	U.S.A.	Canada	U.S.S.R.	Argentina	U.S.A.	U.S.S.R.	Canada	U.S.S.R.
Year Built	1944-47	1952	1954	1954	1955	1958	1960	1960-62
Where Built	San Pedro, Calif.	Lauzon, Quebec	Helsinki, Finland	Weser, Germany	Pascagoula, Miss.	Leningrad	Lauzon, Quebec	Helsinki, Finland
Length, Over-all	269'	310'	273'	277'10"	309'6"	440'	315'	390'
Length, Waterline	250'	300'	265'	262'	290'	420'	307'3"	360'4"
Beam, Waterline	62'	65'	63'	61'	72'6"	90'	69'	79'
Beam, Maximum	63'6"	66'6"	63'8"	62'4"	74'	90'6"	70'	80'5"
Length-Beam Ratio	4.0	4.6	4.2	4.3	4.0	4.7	4.5	4.6
Displacement, Maximum	6,515	9,930	5,360	4,830	8,640	16,000	8,974	15,000
Draft, Maximum	29'	30'3"	23'	21'4"	29'	30'3"	29'	34'6"
Flare, Amidships, Waterline	20°	6°	—	—	20°	—	6°	18°
Speed in Knots	16	14.5	—	—	18	15.5	19.5	—
Propulsion Machinery	Diesel Electric	Steam Recip.	Diesel Electric	Diesel Electric	Diesel Electric	Nuclear Turbo-Electric	Diesel Electric	Diesel Electric
Number Shafts Forward	*1	—	2	—	—	—	—	—
Aft	2	2	2	2	2	3	3	3
Horsepower	10,000	10,800	10,500	6,500	21,000	39,200	15,000	22,000
Cruising Radius	25,000	12,000	—	—	12,000	unlim.	20,000	20,000
Complement	182	61	117	170	360	900	77	—

* Forward motor and propeller with shaft removed.

- Reduced vulnerability of wing propellers. Smaller propellers may be used because reduced power is available for each of the wing shafts, thereby bringing the tips deeper below the surface of the water.

- More power remains in the event of damage to one screw.

- With one screw directly ahead of the rudder, steering is improved.

- The three-shaft installation makes possible a better arrangement of machinery spaces so that flooding or fire in any one complete engine room would not render the icebreaker helpless.

- Damage to any propeller will affect steering far less than damage to one propeller in a two-shaft system due to the imbalance of forces in the event power cannot be applied to the damaged propeller.

- Reversal of wing propellers while the icebreaker is charging has greater effect in ensuring that the ship does not become stuck at the forward point of progress while breaking heavy ice.

In commenting upon the performance of the Canadian version of three-shaft installation, the former master of the *John A. MacDonald* writes:

While handling this vessel during my period in command, I cannot report that I experienced any evidence of unequal torque, in fact I would submit that I found *MacDonald* ideally responsive during manoeuvring with the equal division of power on each shaft.

During icebreaking, a great deal of working astern in ice, particularly in winter operations in the Gulf of St. Lawrence is required, and at the outset I found *MacDonald* possibly a little more difficult to control than our twin screw icebreakers, however, in experience gained by applying power on any desired shaft when required this disappeared and she was found to be capable of working astern as well as any other icebreaker in our fleet.

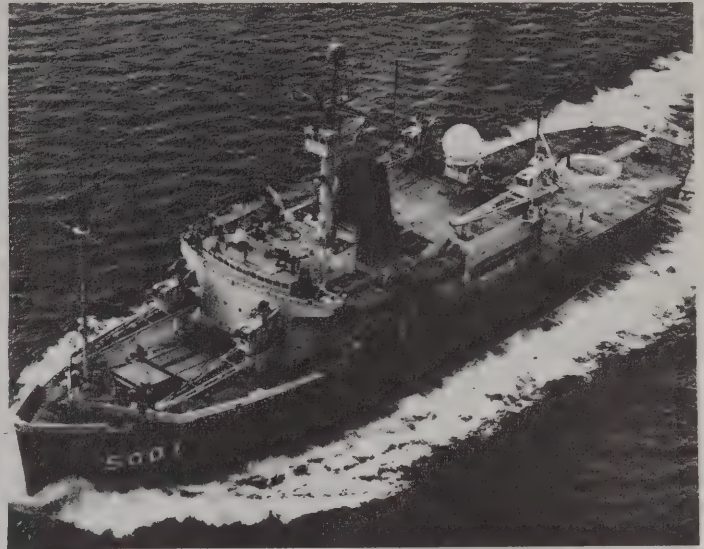
I always considered by result that the centre propeller provided the major thrust and effectiveness in breaking ice, and many times contemplated that more power would be desirable on the centre shaft. This could well be advantageous.

Icebreaking ability, often—and quite mistakenly—is defined as the thickness of ice that a ship is capable of breaking. Other factors being constant, the thickness of ice which can be broken actually depends upon the amount of free surface adjoining the ice. A solid, monolithic sheet of ice imposes the most difficult conditions. As this icebreaking ability is dependent upon the form of the ship, the displacement, the thrust, the location of the center of gravity, the physical properties of the ice, and perhaps other variables, the design features within this listing should be so constructed as to obtain the optimum performance.

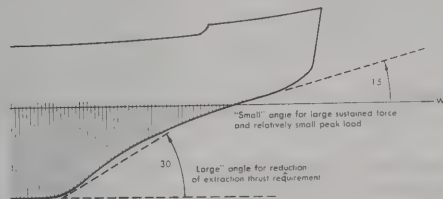
Since the heaviest icebreaking is effected by "ramming"—the bow rising up on the ice and then sinking through—icebreaking ability in this instance depends directly upon the magnitude of the downward force generated on the ice at the bow. The choice of the 30° bow angle presently used on all icebreakers is the

The 8,566-ton Japanese icebreaker *Fuji*, most modern in the world, has air-conditioned quarters, three helicopters with hanger and maintenance facilities, anti-roll devices, and 20 per cent more icebreaking ability than U. S. Wind-class icebreakers.

Tokyo News Service



result of trial and error. Lessening the angle increases the downward acting component of



force so that the ship either becomes "stuck" after ramming ice or shoves the ice up in a pile forward of the bow.

A study made at the Massachusetts Institute of Technology suggests a new concave-type icebreaking bow which would have the advantages of both the lesser and the 30° bow angles. Other valuable suggestions from the same source to increase simultaneously the downward thrust exerted and reduce the extracting requirement demanded after each charge are: the employment of a blunter bow, and a decrease in friction through the application of nonviscous coatings (lubrication, heating, or Teflon).

The task of conveying cargo ships through the ice perhaps conveys the greatest compromise in icebreaker construction. As the preferred course is usually a series of courses along a track at those points where the ice floes are weakest and where the ship can proceed with the least difficulty, a short-hulled icebreaker is desired.

Ease in maneuvering is also helpful in breaking out beset ships. The sharp changes of course made by such an icebreaker, both voluntary and involuntary, render the chore of station-keeping extremely difficult for cargo ships behind the icebreaker. As a result, they may be unable to keep within the swept lane and be forced out into the pack with possible chance of damage and temporary besetment. Longer icebreakers more nearly have the turning circles of conventional ships and also provide more space for cargo, laboratories, and engines.

The only criterion of the beam should be that it be wide enough to clear an adequate

path for convoyed ships. As a rule, an icebreaker breaks a channel about one-half a yard wider than herself. While it is possible that sections of the ice will upend simultaneously on each side of the icebreaker and reduce the width of the channel astern by twice the thickness of the ice, such action is considered extremely unlikely. Too large a beam may also enable ice to pass under the icebreaker so that it will be forced against the propellers.

The low-beam ratio of icebreakers with no parallel middle body gives good maneuverability. Too low a ratio, however, presents a large metacentric height, making a vessel stiff and uncomfortable at sea. The trend, within certain limits, is for higher ratios.

The complete answer to longer cruising radius for icebreakers is, of course, nuclear propulsion. The advantage of being able to cruise for over a year in the ice fields without refueling is self apparent, and particularly so in the quest for scientific information.

The Soviet Union appears to be so pleased by the technical success of its nuclear-powered *Lenin* that two more similarly powered icebreakers are planned, if reports are correct, with construction of the first probably starting in 1969.

A new icebreaker named after one of Captain Robert F. Scott's famous expedition ships, the *Terra Nova*, is on British drawing boards. Probably the very latest icebreaker to be completed is the Japanese 320-foot *Fuji* of 8,566 tons full load displacement, built at the Tsurumi Shipyard of Nippon Kokan. This ship, designed to take advantage of experience gained during six Antarctic expeditions made by the *Soya*, a ship converted for polar exploration, has such desirable features as fully air-conditioned living quarters, three helicopters for rapid transport of personnel and cargo between ship and shore installations, anti-roll devices, an elevator, a conveyor for cargo, and safeguards to protect the rudder and propellers. Diesel generators drive her four motors at a maximum of 12,000 horsepower giving the ship an icebreaking ability amount-

ing to about 20 per cent greater than our Wind-class icebreakers.

Finland, Norway, Sweden, Denmark, and Germany are employing new and unusual ideas in their icebreaking vessels. Recurrent needs of keeping waterways and harbors free of ice in the wintertime for shipping have resulted in a great deal of research and experimentation in icebreaking in these countries.

For our own icebreaking problems there seems little doubt that our icebreaker construction program is inadequate. Too long have we had to wait for the benefits to be derived from improved materials, better construction techniques, and lessons learned from operating experience. Too long have our icebreakers been relegated as second class ships when building funds are limited.

It is high time that we take a hard, calculating look at what kind of ship will best



A graduate of the U. S. Naval Academy in the Class of 1931, Captain McDonald earned his aviator's wings and served in the USS *Langley* (AV-3) and the USS *Saratoga* (CV-3) from 1934 to 1936. During World War II, he was Commanding Officer of the USS *Hovey* (DMS-11) and the USS *Wren* (DD-568). He served on the staff of Commander, Western Sea Frontier, and later commanded the icebreaker *Burton Island* (AG-88). From 1957 until his retirement in 1962, he was Task Unit Commander and Deputy Commander of DEEP FREEZE Operations. Now a free lance writer, he was a polar consultant with the Arctic Institute of North America from 1962 until 1965.

serve our icebreaking requirements, one which will be more capable, more efficient, but less prone to damage. Extensive studies and tests in hull forms and propellers should be conducted. Innovations incorporated in the latest foreign icebreakers, particularly with regard to the unique advantages offered by nuclear power, should be reviewed.

Icebreaker design has progressed a long way since the first time an ice-clearance ship was envisioned, though, admittedly, it is still far from the ultimate craft yet in this respect. No icebreaker in the world will ever be powerful enough to move some ice, yet a better icebreaker will move far more ice than a run-of-the-mill one. We should insist, therefore, that we have the best icebreakers that can be built now for the jobs on hand and for those that beckon. Anything less is compromise.

Deep Freeze '67 Covers Serviced

The U. S. Naval Support Force, Antarctica, has announced that covers are now being accepted for postmarking at South Pole and Byrd Stations in Antarctica and aboard Deep Freeze ships which operate a post office, during the 1966-67 Antarctic season.

Collectors are limited to one cover per person to be postmarked at Byrd Station and South Pole Station, and three covers per person from each Deep Freeze ship.

Byrd and South Pole Station postmarks can be obtained by placing two addressed covers bearing United States postage at the letter mail rate in an envelope and mailing them to: Deep Freeze Philatelic Mail, U. S. Naval Construction Battalion Center, Davisville, R. I. 02852. International Reply Coupons may be used by collectors from foreign countries to defray postage costs on covers.

One cover will be sent to Byrd Station and the other to the South Pole for postmarking. If a cancellation is desired from only one station, the word "Byrd" or "Pole" should be written in the lower left corner of the cover.

Philatelic mail to be postmarked at Byrd or South Pole Station must reach Davisville not later than September 1 in order to be processed during the Deep Freeze '67 Antarctic winter. The postmarked covers should be received by the collector between October 1967 and April 1968.

Cancellations from participating ships can be obtained by sending covers to: Deep Freeze Philatelic Mail, (name of ship from which postmark is desired), (The Fleet Post Office Address).

The following Deep Freeze '67 ships operate a post office. The date given in each case is the deadline for arrival of collectors' covers. They are:

USS Mills (DER-383) FPO New York, 09501—deadline August 1;

USS T. J. Gary (DER-326) FPO New York 09501—September 1;

USCGC Glacier (WAGB-4) FPO San Francisco 96601—September 15;

USCGC Eastwind (WAGB-279) FPO New York 09501—September 15;

USCGC Westwind (WAGB-281) FPO New York 09501—November 1.

Covers postmarked aboard Deep Freeze ships should be returned to the philatelist in May or June 1967.

Philatelic mail will be returned unprocessed when more than the authorized number of covers is submitted, if it appears that a commercial motive is involved, if covers are received after the cutoff date, or when covers are submitted to Deep Freeze ships or units which do not operate a post office.



The floral emblems of the coats of arms of the Yukon and Northwest Territories are featured on two stamps, released by Canada Mar. 23. The Yukon's colorful fireweed is seen in tones of blue, red and green. Its companion issue will be in shades of yellow, green and olive, to illustrate its mountain avens.



Argentina Launches Antarctic Rocket

To mark the Launching of Rockets from the Argentine Antarctic, Argentina, on February 19, released a 27.50 Pesos commemorative in three colors. It was printed in a quantity of one million at the State Mint by lithography.

The design is a double-barreled one for topicalists in that it has a map, and a Centaur Rocket.

In February 1965, several experiments in cold-temperature regions were conducted by the Argentine Republic as part of the so-called "Matienzo Project". They consisted in the launching of nine sounding balloons and "Gamma Centaur" rockets, made in the country, and instrumented to measure x-ray radiation in the upper atmosphere.

Argentina has several bases in the vast, cold regions of Antarctica, one of the great laboratories of nature. Meteorologists agree in that atmospheric conditions and phenomena occurring over the Antarctic are closely related to world climate.

The "Matienzo Project" was planned and accomplished by the Argentine Aeronautics through the intermediary of the Aeronautics and Space Research Institute of D.I.N.F.I.A. (Cordoba) with a view

to cooperating constructively in the world's efforts to probe the mysteries of space and to increase knowledge of the universe.

The immediate objectives of these explorations were to measure cosmic radiation by the simultaneous launching of sounding rockets from two different launching sites as far as 3000 kilometers apart, the Matienzo base in Argentina's Antarctic Territory (64 degrees 58' South latitude - 60 degrees 64' West longitude) and the Research and Launching Centre for self-propelled missiles at Chemical, La Rioja (30 degrees 30' South latitude - 66 degrees West longitude).

The launching of both rockets and balloons from Matienzo base was successfully completed, less than 24 hours after the arrival of the TA-05 plane, with the assistance of an advanced party and the base's staff.

The rockets as well as their payloads were supplied by the National University of Tucuman. I.I.A.E. personal was responsible for ground operations and data recording work.



FRENCH ANTARCTIC TERRITORIES.

Tryptic of two bicolored airmail values, separated by inscribed label, publicizes launching of First French Satellite.

PONDS ARE BLOWN INTO AIR BY BLAST

Films of Nuclear Test in the Aleutians Reveal Force

By WALTER SULLIVAN

The New York Times

WASHINGTON, April 20—Shock waves from a nuclear explosion fired almost a half mile below an Aleutian island last year threw lakes and ponds into the air, according to a moving picture record shown here today.

The waves also shook seismographs around the world in a manner that, according to British specialists, was clearly different from that of waves generated by the many natural quakes of the same region.

The explosion, with a force equal to 80,000 tons of TNT, was fired in a plugged hole 2,346 feet deep, drilled on the island of Amchitka. The explosion was given the code name Longshot.

Moving pictures of the event were declassified in time for showing at a symposium today on seismic observation of the event. It formed part of the annual meeting of the American Geophysical Union at the Sheraton Park Hotel.

A camera some distance away from the blast, but aimed at the hangarlike building over the hole, slewed wildly when the shock waves reached the surface.

However, in its film, masses of water could be seen flying up from the many bodies of water on the soggy landscape. Then aerial photographs were shown. It seemed as though entire lakes flew 100 feet or more into the air. Yet the building atop the hole remained standing.

So far, it was reported, seismic reports have been received from more than 350 stations around the world. Some 70 of them were installed especially for the event. Others, such as new permanent arrays of seismographs in Australia and India, were rushed to completion in the final days before the shot, which took place last October 29.

The observations of Longshot by British arrays in Canada, Scotland, India and Australia were described by Dr. H. I. S. Thirlaway of Britain's Atomic Weapons Research Establishment. "Shallow earthquakes from the vicinity of the shot point," he said in his abstract, "gave recordings significantly different from those of Longshot."

The purpose of the blast was to see to what extent a region of many natural quakes and chaotic geology could be exploited to conceal underground bomb tests. The explosion was made heavy enough to be clearly

detected around the world so that there could be analyses of wave travel through a maximum variety of paths.

This, it is hoped, will help develop effective ways to outwit attempts at clandestine testing. The island arc of the Aleutians, with its volcanoes, offshore trench and many quakes, seems a sister formation to that of Kamchatka and the Kurile Islands on the Soviet side of the North Pacific.

The project was carried out by the highly secret Defense Atomic Support agency on behalf of the Advanced Research Projects agency in the Department of Defense. The latter is responsible for developing better methods for detection of nuclear explosions.

The shot provided the first controlled test, with long-range shock waves, for the gigantic large aperture seismic array in Montana. This consists of 525 seismometers sunk in deep holes over many hundreds of square miles.

The instruments are wired into a central computer station that can correlate arrival times of individual waves at each site and thus learn with great precision whence they have come.

The chief surprise in the results was the early arrival times of the blast waves at almost all stations. These times varied in a strikingly regional manner. Thus, the waves reached stations in Scandinavia and eastern North America about seven seconds ahead of their predicted times, whereas they hit southern California only one second early.

These waves had traveled through the deep region of the earth known as the mantle. The results were in line with observations from the so-called Gnome explosion of 1961. This was a nuclear blast in a cavern near Carlsbad, N.M., whose shock waves traveled at different speeds, depending on their direction.

As reported at the opening session of the conference yesterday, analysis of the Gnome results provided one of the first hints that there is great regional diversity of material even hundreds of miles below the earth's surface.

Soviet Rescue Made in Arctic

MOSCOW, March 27 (Reuters)—Six Soviet Arctic biologists were rescued by helicopter from a drifting ice floe cracked by a blizzard in the White Sea, the Soviet press agency Tass reported today. The floe had already been cracked twice since the scientists landed on it early this month to study seals.

Polar Scientists Lifted

Moscow, Feb. 8 (Reuters)—Russian Arctic fliers have begun to evacuate scientists from the drifting research station North Pole 14 because the ice floe on which it is built is breaking up.

Alaskan Dam Plan Assailed at Parley Of Conservationists

The New York Times

PITTSBURGH, March 16—Conservationists were warned today that the proposed highly controversial Rampart Canyon power dam in southeastern Alaska that would cost from \$1.5-billion to \$2-billion "should not be authorized at this time."

The proposed dam, referred to privately as "a massive Federal boondoggie," would reportedly create a reservoir that would take 30 years to fill and ultimately inundate an unspoiled eight million acre wilderness area the size of New Jersey or 600 square miles larger than the now-polluted Lake Erie.

It would reportedly be man's largest manmade lake and needlessly so, according to Dr. Stephen H. Spurr, dean of the University of Michigan School of Graduate Studies.

"Even today," he told delegates at the 31st North American Wildlife and Natural Resources Conference at the Pittsburgh Hilton Hotel, "it would appear to be cheaper to build a nuclear plant on the Pacific Coast rather than transmit power south."

Delay in Washington

The New York Times

WASHINGTON, March 16—The Administration appears to be sitting on the proposal to construct the Rampart dam.

The Army Corps of Engineers has completed a feasibility study approving the project and submitted it to the Department of the Interior for review. The Army Engineers and the Interior Department's Bureau of Reclamation disagree on some phases of the feasibility studies. The study cannot be submitted to Congress until the review is complete and all agencies are in agreement.

Rifle Group Drops Award To Help Protect Polar Bear

WASHINGTON, June 18 (AP)—The National Rifle Association announced this week it was dropping its annual trophy award for polar bear to help protect the dwindling population of the big-game animal.

The action followed a decision by the Boone and Crockett Club, the official keeper of North American big-game records, to eliminate polar bear from the list of animals eligible

for big-game record competition.

The Interior Department's committee on rare and endangered fish and wildlife has listed the polar bear status as undetermined.

Copter in Ice Floe Rescue

ANCHORAGE, Alaska, Jan. 23 (AP)—A hunter who spent the night on a drifting ice floe was rescued by helicopter today 20 miles off the Alaska Peninsula about 400 miles southwest of here. Identified as Migeley Kelly of Egegik, he was reported in good condition although suffering from frostbite.

Eskimo Compiles Dictionary

MOSCOW. (Reuters)—An Eskimo officer in the Soviet merchant marine has helped compile an Eskimo-Russian dictionary, TASS, the Soviet press agency, reported recently.

3 MOUNTAINS NAMED FOR U.S. SCIENTISTS

The Department of the Interior has named a 10,180-foot mountain in central Alaska in honor of the late J. Louis Giddings, a Brown University professor and a well-known Arctic anthropologist.

A statement announcing the name for the hitherto unnamed peak said Professor Giddings also was "the leading Alaskan archeologist at the time of his death." He died at the age of 55 in December, 1964, from injuries suffered in an automobile accident.

In many expeditions to Alaska, Professor Giddings uncovered extensive evidence of ancient Arctic civilizations. Much of what he found contradicted previous theories on the lives and habits of the early peoples there.

Mount Giddings lies about 125 miles east of the continent's highest mountain, 20,300-foot Mount McKinley. It is in the Alaska Range about 85 miles south-southeast of Fairbanks.

The Interior Department also named two nearby mountains for two other Alaskan investigators, who had worked closely with Professor Giddings in related fields for many years. All three died within almost a year of one another.

A 10,720-foot mountain was named for Dr. Otto William Geist of the University of Alaska, a pioneer researcher in paleontology, archeology and glaciology, and a 10,315-foot mountain was named for Dr. Ivan Skarland, also of the University of Alaska, anthropologist and archeologist.

In the early 1930's, Professor Giddings and Dr. Skarland were field assistants to Dr. Geist in what the Interior Department calls "outstanding archeological investigations of the St. Lawrence Island."

Hovercraft Is Tested in Arctic, But Canada Finds Cost Is High

By JOHN M. LEE

The New York Times

TUKTOYAKTUK, Northwest Territories — A vehicle that travels a few inches above land, water or snow is being evaluated by the Canadian Government for a new solution of the old problem of Arctic transportation.

After two weeks of trials under Arctic conditions, the vehicle, called a Hovercraft, has shown physical capability, but the present cost makes its use economically unfeasible, according to Curt Merrill, official observer for the Department of Northern Affairs.

Recently the Hovercraft, the British SRN-5, was put through its paces over rough sea ice just off the coast of this Eskimo village, 200 miles north of the Arctic Circle. A plane-load of senior United States military officials arrived to observe the trials.

On the frozen sea it was a sunny 27 degrees, with a stiff breeze. The only sounds were the wind, the rustle of snow and an occasional cracking well below the surface of the thick ice.

Then, with a roar, the Hovercraft, looking like a giant orange beetle, rose from its resting place on the ice and skittered away.

The craft, capable of speeds as high as 75 miles an hour,

is 39 feet long and 23 feet wide. It operates on a low-pressure cushion of air maintained within four-foot-high flexible skirts by propellers drawing air in through the roof. Powered by a 900-horsepower gas turbine engine, the Hovercraft gives an undulating ride like that of a speedboat in choppy water.

Although the Hovercraft showed great mobility, it requires a relatively flat route. It can climb a grade of one foot in six but would have trouble crossing obstacles more than four feet high.

On this trip, however, the Hovercraft performed in steeplechase fashion, jumping repeatedly over a pressure ridge of ice five feet high. Passengers without seat belts were jolted out of their seats.

The SRN-5, made by the Westland Aircraft Company, now part of the British Hovercraft Corporation, is priced at about \$225,000. The front-loading vehicle carries two tons of freight or 15 to 20 passengers.

"The machine works best in high-density traffic, and what we have here in the Arctic is low density," Mr. Merrill said. "Besides the high capital costs, the aircraft engine makes it expensive to operate."

"It's a bit early in the day

for this machine," he added. "Perhaps future vehicles will be cheaper."

Maj. Roger Harris of the British interservice unit, which is conducting the trials with the Canadian Defense Research Board, said Hovercraft were in use in the San Francisco Bay area and between the Isle of Wight and the British mainland.

"It offers exciting possibilities here," he said, "over Arctic tundra, ocean ice and river channels."

Meanwhile, Eskimo villages and Government posts along the Arctic coast are awaiting the summer break-up of the frozen seas so that supply ships can pay their annual visits.

With air freight expensive even into towns where landing strips can be built, the lack of economic, all-weather transportation continues to deter development in communities in the MacKenzie River Valley as well as along the coast.

Hovercraft Hits River Ice

INUVIK, Northwest Territories, May 31 (Canadian Press) — A British hovercraft undergoing tests in the Canadian Arctic suffered minor damage yesterday after running into tumbling ice in the Mackenzie River. The craft was on a 400-mile test run.

Yukon Coldest Area in Canada

The Yukon Territory, home of Dangerous Dan McGrew, is the coldest area in Canada, the National Geographic says. The weather station at Snag once recorded 81 degrees below zero

The Motorized Sled May Soon Replace Dog Teams in North

FROBISHER BAY, Northwest Territories (Canadian Press)—The motorized snowsled is fast overtaking the dog sled as a means of travel in the Canadian Arctic.

The trim toboggan-like craft is seen everywhere in the Far North. In large settlements such as this one on Baffin island, it is used much as southerners use cars. In more isolated communities, Eskimos set out on them for the hunting grounds.

The Northern Affairs Department makes them available to its employees, and even the Royal Canadian Mounted Police uses them on short patrols.

Old-timers shudder at the thought of Eskimos traveling long distance on the fragile craft. The rough terrain and brittle cold make breakdowns common. One Hudson's Bay Company trader said the machine, which sells here for about \$1,000, will cost its owner another \$400 a year for new parts.

A breakdown while the hunter is far from home could mean death, and there have been reports of this happening on two occasions. The wind whipped up by the motors also has led to an increase in cases of frostbite among Eskimos.

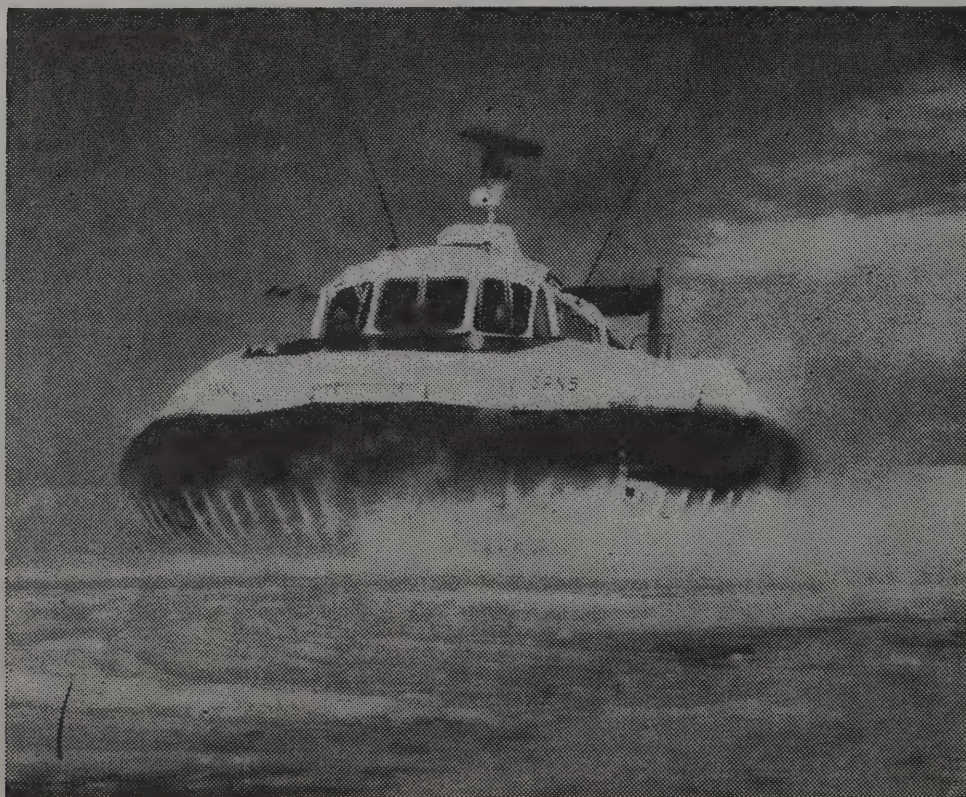
But their swift acceptance by hunters and trappers here points up the need for a faster means of getting about than by the time-honored dog sled. Studies are now under way in the Northern Affairs Department to provide it.

Meanwhile, the debate over dogs versus the motorized sled continues in the North. A strong point for the sled is its speed. It can travel three to four times faster than dogs, and thus brings the hunter home the same day rather than have him spend three to four nights away from home.

Defenders of travel by dog team say dogs are more reliable.

Quebec Find May Be Nordic

QUEBEC, Canada (AP)—Louis Edmond Hamelin, Director of Laval University's Nordic Studies Center, recently announced the discovery of a possibly pre-Columbian Norse settlement in the Ungava Peninsula of Northern Quebec by an archeological expedition headed by Thomas Lee. House foundations, a church-like structure and a stone dam were found in a European-type village that may have been built by a roving Greenland Norse colony. The expedition will explore further next summer.



The New York Times (by John M. Lee)

HOVERCRAFT rides on jets of air over frozen surface at Tuktoyaktuk, in the Arctic

Inuvik in Arctic: A City Expands On the Permafrost

The New York Times

INUVIK, Northwest Territories—Here, 200 miles inside the Arctic Circle, atop a thick layer of permafrost, Canada is building its first Arctic city.

Although it is a new town, it is in a flurry of construction and already has a mile-long airstrip and a new terminal.

The 2,500 Inuvikians have modern housing, patronize a hotel, a motion picture theater, a department store and send their children to new schools. The strikingly modern Roman Catholic Church looks like an igloo.

Residents here also enjoy modern plumbing, thanks to the "utilidor," metal-clad tunnels that run above ground carrying steam heat and water to all buildings, and taking away sewage. Ordinary underground lines will not work here because of the permanent frost.

Three or four years ago, when much of Inuvik was still on the drafting boards, skeptics called it a "\$50-million blunder." But the Government now says it will soon have 5,000 residents as plans go forward to develop and settle the Canadian north.

Inuvik, at the head of the Mackenzie Delta, is a Government town, despite the fact that it was designed for Eskimos and Indians. In fact, fewer than one-third of the residents now are Eskimo and only 11 per cent are Indians. These "first settlers" of the North still cling to their old community at Akla-vik, 40 miles to the west, despite unhygienic conditions. But one Government official says, "Eventually they will come to Inuvik where the living is easier and, certainly safer."

In Canada's vast Northwest Territories there are 80 communities, ranging from a few buildings around a trading post or a weather station to Yellowknife, with a population of 3,500. Hay River on the southern shore of Great Slave Lake is the center of a multimillion dollar commercial fishing industry. It produces white fish for markets in southern Canada and the United States.

Fort Smith, just north of the Alberta border, is the administrative center for the Western part of the territories. But Inuvik has ambitions to overtake all of these and eventually become Canada's Arctic capital.

The Northwest Territories and the Yukon on the Alaska border have a mineral wealth capable of supporting many times the present population of 50,000. But until vast sums of money are spent to develop the resources and transportation, the country is economically alive only to the extent of its fishing and trapping.

Canada Extending Eskimo Vote To Regional Territory Elections

The New York Times

OTTAWA, May 28—Parliament this week approved legislation, which gave all Eskimos a voice in their Government.

Voting for representatives on the Northwest Territories Council will be the first step toward bringing some 9,000 primitive people of the Arctic into the Canadian democracy.

The franchise for these people has been a long time coming, partly because of such physical obstacles as a harsh climate, tremendous distances and a lack of communications. Vast areas are uninhabited except by caribou, seal and walrus.

Previously, Eskimos voted only in two Federal elections.

The new bill will extend the franchise to three constituencies in the northern and eastern Arctic. These areas, which are sprawled over thousands of square miles, range from Hudson Bay to the North Pole, and from Baffin Island on Frobisher Bay in the east to Victoria and Banks Islands in the Beaufort Sea in the west.

Preparations for the election will begin as soon as Parliament's bill is signed into law by Governor General Georges F. Vanier, the representative of Queen Elizabeth II. This is expected in a few days.

B. G. Sivertz, commissioner of the Northwest Territories, said in an interview that he planned to set the election for Sept. 19, when the Eskimos will, not yet be isolated by the Arctic winter.

The Eskimos, who live mostly in small communities where hunting, trapping or fishing are available, will choose representatives to sit on the territorial council that serves as a legislative body. The council currently has four elected members representing the more populous Mackenzie River Valley, in the Western Arctic. There are also five members appointed by Ottawa.

By extending the vote to Eastern and Northern regions, the Government has authorized a larger council with elected members that will have a 7-to-5 majority for the first time.

At this state of territorial development, all the council's "legislation" must still be approved by the Government in Ottawa. Federal authorities, to the irritation of residents of the North, hold a firm grip on all public expenditures. The reason is that the Northern Territories, while rich in natural resources, are yet too underdeveloped to pay their own way. The Northwest Territories,

which spread over one-third of the Canadian land mass, has a population of only 24,000 Indians, Eskimos and whites. Except for a few tradesmen, most inhabitants live by a hand-to-mouth existence.

The Yukon, which is situated between the West of the Northwest Territory and Alaska, has a slightly more advanced Government. It elects its council, and the appointed commissioner lives in Whitehorse, the capital. The Northwest Territory without a capital is administered by offices in Ottawa.

Both the Yukon and the Northwest Territories are ambitious to become provinces like the 10 that form the Canadian confederation. At its recent winter meeting, the Northwest Territories Council adopted a paper drafted by Mr. Sivertz, which suggested that the territory would be ready for provincial status in 10 years.

This working paper said that the Government of the Northwest Territory should "have as many as possible of the features common to responsible government in Canada; exercise legislative powers comparable to those of the provinces and in keeping with changing conditions, and progress into provincial statutes between 1972 and 1976."

Giving all citizens, including Eskimos and Indians, the vote for local self-government is considered a major step toward becoming a province. However, much depends now on the growth of the population and the development of resources, which will provide the basis for self-support.

Scots Tag Young Salmon To Study Migration Habits

GLASGOW, Scotland (AP)—Scottish scientists are tagging young salmon on four Scottish rivers in an effort to find out how many of the fish migrate to Greenland.

An attempt to find out something about the return journey of salmon from Greenland to their rivers of origin here was started last fall, when Scottish and Danish workers tagged salmon on the Greenland coast. None of these tagged fish has yet been recaptured, but anglers and netsmen have been asked to watch out for any salmon bearing yellow plastic tags.

Twelve scientists from the freshwater fisheries laboratory at Pithochry, Perthshire, are working on the rivers Tweed, Tay, North Esk and Conon.

ESKIMO CHILDREN GO WITH MOTHER

Officials Find Many Babies
at Public Meetings

OTTAWA (Canadian Press)—Eskimo mothers have probably never heard of baby sitters—or if they have, they seem to have rejected the idea.

No matter where the mother goes, all the children go too. When she shops at the nearest Hudson's Bay Company trading post, the baby will ride along tucked in the compartment at the back of the mother's parka.

If the mother works or goes to a public meeting, the children will stay with her or play nearby. The great affection Eskimo parents have for their youngsters has in the past meant they could do as they pleased up to six years of age without knowing the meaning of punishment.

But nowadays children who rely on this enlightened practice sometimes are in for a shock as parents increasingly employ corporal punishment.

Members of the advisory commission on the development of government in the Northwest Territories may consider themselves experts on how Eskimos raise their young.

At more than 50 public meetings in the North, their audiences were well-sprinkled with children and there were plenty of opportunities for first-hand observation.

The commissioners no longer bat an eye when it comes time to breast-feed babies.

They also came to admire the speed with which the Eskimo mother changes diapers.

One could hardly tell a naked child was running up and down the aisle the way commissioners would continue making points to their adult audiences.

Sometimes the commissioners cast aside all pretensions of the formality usually associated with government commissions.

At Pelly Bay, for example, Chairman A. W. R. Carrothers of London, Ont., dean of law at the University of Western Ontario, was observed showing Eskimo children how to do tricks with their hands.

And in another corner of the meeting hall a second member of the commission party was trying to tell a group of children as gently as he could that Batman and Superman do not exist outside of comic books.

AN ESKIMO JOINS CANADIAN COUNCIL

New Legislator Presses for Development of North

By JAY WALZ

The New York Times

OTTAWA, Feb. 4—"I want no favors from you because of my origin."

So spoke the first Eskimo to become a member of the Northwest Territories Council. Abraham Okpik of Yellowknife was making his first speech this week at the Council's mid-winter meeting in Ottawa.

Mr. Okpik's visit to the Canadian capital was for him something of a concession. He thinks his people in the Far North should have more self-government and that the seat of their government should be in the North, not here.

Mr. Okpik made a few ceremonial remarks in his native Eskimo. Then he got down to business in fluent English.

"If I don't understand the subjects you bring forth, I will ask questions," he declared. "If I am too hasty, you can put me in my place."

"Eskimos," he said, "demand more opportunities and a higher standard of living. They want to live in a North that is developed. They must have a voice in the development."

In an interview, he acknowledged that "all Eskimos must change their way of life if they are to contribute to Canadian society."

"There are obstacles, such as lack of education, discriminations and our poverty, but we shall succeed," he asserted.

Mr. Okpik, born 36 years ago of trapper parents in the tundras of the Mackenzie River delta, has made the most of opportunities available to Eskimos. At the All Saints Anglican Residential School at Aklavik, he learned English from a Scotswoman. He retains her burr in his speech.

Stricken with tuberculosis at 16, he spent three years in an Edmonton hospital. There he learned more English; when he recovered he was hired as a laborer-translator on the United States Distant Early Warning (DEW) line.

He also served with the welfare division of the Department of Northern Affairs in Ottawa but, unhappy with the climate of southern Canada, he later went to Frobisher Bay to direct a rehabilitation center.

In 1959 he was asked to speak at the opening of an exhibit at the Stratford, Ont., festival. There he was presented to Queen Elizabeth II and chatted about the North with Prince Philip.

"Abe" Okpik speaks of the

North with intensity. His black eyes flash behind heavy black horn-rimmed glasses. He has the build of a football lineman.

He said he wanted to see the Canadian North, which ranges over one-third of Canada, become the country's biggest — perhaps wealthiest — province. With other members of the Council, he fights the movement to extend Canada's western provinces — Manitoba, Saskatchewan, Alberta and British Columbia — into the North beyond their present boundaries at the 60th Parallel. The Canadian North would "disappear into a long row of provincial backyards," if this happened, he says.

Vast mineral riches lie in the North and the area should be opened to tourists, Mr. Okpik said. This week he advocated game preserves in the Arctic for safaris by big game hunters.

Parts of the Arctic — certainly many islands — have never been explored.

"Shouldn't we make a study to see what sort of game is up there and whether it could be used to attract tourists to the Northwest Territories?" he asked.

Traditionally, game hunting there has been the right of the Indians and Eskimos.

Zoologist and Photographer Join to Film Canadian North

EDMONTON, Alberta (Canadian Press)—When Al Oeming, a zoologist here, met Heinz Sielmann, a noted German photographer, at a Munich festival, it was the beginning of the realization of a childhood dream for Mr. Sielmann.

Mr. Sielmann had long wanted to produce a documentary film on the Canadian North, and the meeting has led to an agreement with the British Broadcasting Corporation to produce just such a film for the B.B.C. this summer.

Mr. Oeming, who is director of the Alberta Game Farm near Edmonton, has made many trips to the north for research and to obtain animals for his game farm.

He and Mr. Sielmann plan to film caribou migrations, the flight of migratory birds that spend the summer in the Arctic, grizzly bears fishing, walrus and the changing seasons on the Northern Tundra.

Canada to Weigh Smelter In Northwest Territories

OTTAWA, Feb. 25 (Canadian Press)—The Government is engaging independent consultants to study the feasibility of building smelter facilities at Pine Point, Northwest Territories, to process the rich lead and zinc ores on the south shore of Great Slave Lake, Resources Minister Arthur Laing announced today.

He also said the Government had approved the export of

ESKIMO'S MURDER ARGUED IN CANADA

No Punishment Is Given in Killing of Deranged Wife

By JOHN M. LEE

The New York Times

YELLOWKNIFE, Northwest Territories, May 10 — The administration of justice in the Arctic is again under discussion across Canada because of an Eskimo murder trial last month. One defendant was acquitted and another given a suspended sentence.

Judge John H. Sissons, who has been adapting Canadian laws to Eskimo culture since 1955, has generally been praised for his handling of the case.

But in Yellowknife, where the 74-year-old judge has his office, the case has raised questions about the Government's attitudes.

The case was tried at Spence Bay, 750 miles north of Churchill, Man. A mentally deranged Eskimo woman, Soossee, was killed and the evidence indicated that her husband had ordered her shot because he thought she had a devil in her and was trying to transmit it by blowing her breath on a band of 20 Eskimos.

Isochee Shooyook, 28 years old, who actually shot the woman, was found guilty of manslaughter — a reduced charge — and was given a two-year suspended sentence by Judge Sissons. The woman's son, Aiyaoot, 21, who allowed Shooyook to use his rifle after Shooyook's rifle ran out of shells, was acquitted.

An Eskimo diary of the events last July said Soossee tore her hair, threw stones, destroyed equipment and threatened to kill others. She was abandoned on an island, but finally her husband ordered some men to return and kill her if she would not leave voluntarily.

Judge Sissons instructed the jury of three Eskimos and three

greater quantities of lead and zinc ores and concentrates, principally to the United States, which will make a major contribution to Canada's United States dollar earnings.

Pine Point Mines, its parent concern, the Consolidated Mining and Smelting Company, as well as Pyramid Mines, Ltd., and others in the Pine Point area have agreed to make their records available on a confidential basis for the economic study. The consulting concern of Canadian Bechtel, Ltd., will undertake the study.

white teachers that the law flows from a people and that an Eskimo society should be judged on its own terms. And in Eskimo life, mercy killings are condoned.

The jury then rejected the prosecution's argument that the murder was premeditated. It based its verdict on the fact that an elder in a patriarchal society had ordered the killing.

Such attitudes toward Eskimo offenses appear merciful and realistic to some; others condemn them as paternalistic and a mockery of the law. Either the offenses should be ignored, the opposing view holds, or the defendants should be tried without allowances.

Still another view holds that Canada's Department of Northern Affairs has proved inept in trying to bring equality to Eskimos and Indians, destroying self-reliance and self-respect and leaving the people dependent on welfare. This view argues for continuation of the natural state.

Judge Sissons straddles these attitudes. He is known for his sympathy for the accused and for his scorn for civil servants who, he contends, run the Northwest Territories like a colonial bureaucracy.

In his 12 years in the territorial court, the judge has demanded speedy trials near the home of the accused, trial by jury with no discrimination and the right of counsel. He has ruled liberally in favor of Eskimo adoptions and marriages by mutual consent and has countenanced child abandonments and hunting violations. His critics argue that the Eskimo must be pardoned if he is still confused by the white man's justice.

NAME GIVEN GLACIER

Jan. 4

MOREHEAD, Ky. (AP) — A glacier located in Antarctica has special significance to Dr. Madison E. Pryor, a young Morehead State College professor. Pryor received notice last week from the U.S. Board of Geographic Names that the glacier has been named Pryor Glacier.

The name came as a result of Pryor's contributions to the advanced knowledge of Antarctica, according to the board. Pryor spent three years in Antarctica studying animal ecology as a staff member of the Ohio State University Institute of Polar Studies.

Canadians Ski in May

INUVIK, Northwest Territories (Canadian Press)—Deteriorating snow here, 100 miles north of the Arctic Circle, threatened to end the skiing season early. Fans kept the sport alive with a late-May trip to Tuktoyaktuk, 100 miles to the northeast.

NAVY TO REPAIR NORTHERN PORTS

3 Vessels on Way to Take
Up Task in Greenland

June 20

Three military vessels are on their way to the ice-choked waters around Greenland for the annual task of repairing and opening up ports in the Arctic.

The Coast Guard icebreakers Westwind and Edisto, which sailed from New York and Boston, respectively, are due to rendezvous in Thule, Greenland, in the early part of July. The naval cargo vessel Redbud will join them there soon afterward.

The 180-foot vessel's initial assignment will be to rehabilitate navigation aids at Harmon, Newfoundland and Sondrestrom, Greenland, and to activate and repair submarine petroleum lines and set moorings at Port-au-Port, Nfld., Thule, Greenland, and Goose Labrador.

This work is considered necessary by the service to assure delivery of about 72,500 tons and 2 million barrels of petroleum products.

Delivery of this cargo has been assigned to four civilian-manned M.S.T.S. ships — the Craig, Boyce, Towle and Laurientia, and to six tankers, as yet unselected. In addition, the Redbud will be called upon to deliver shipments of petroleum in bulk to Northwest River, Labrador and Cape Atholl, Greenland, and assist in general cargo and bulk petroleum deliveries at two points in Greenland.

The work of the icebreakers is expected to be eased by ice forecasting services to be provided by the United States Naval Oceanographic Office.

The forecasts will provide a long-range ice outlook for the Labrador Sea, Baffin Bay and the west coast of Greenland. There will also be supplementary 30-day ice forecasts as well as shorter-range forecasts and special ice advisories to be furnished by the Naval Weather Service.

The main unloading ports will be Thule, Greenland, and Goose Bay, Labrador, which are scheduled to receive about 24,000 and 40,000 tons of dry cargo, respectively.

The entire operation, under the command of Rear Admiral Reuben T. Whitaker, Commander, M.S.T.S. Atlantic Area, is scheduled to be completed by late October, when the last of the vessels assigned to the mission is due to return to her home port.

Ice Seismic Station Weighed

The New York Times

COPENHAGEN, Denmark, May 27—A Danish-American

6 Britons Plan Cutter Voyage To Trace Leif Ericson's Route

Crew Hopes to Lend Support
to the Vinland Map—
Nantucket Is Goal

The New York Times

LONDON, April 30—A modern expedition in search of "Vinland" will be looking for bays, headlands and sandy beaches described in Norse sagas, including an awe-inspiring stretch of sand dunes called "wonderstrand."

John Anderson, leader of the expedition, said on Wednesday that these dunes would be found "somewhere in the region of Nantucket Sound." The aim of the expedition is to retrace the voyage of the Vikings, who are believed to have discovered America 1,000 years ago.

Mr. Anderson, yachting editor of The Guardian, said that the six-man expedition would sail the 45-foot cutter Griffin from Scarborough, on England's northeast coast, on May 2 or 3, depending on tides, for Greenland.

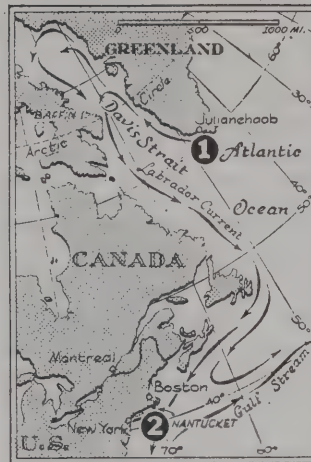
They will try to get as close as ice permits to Greenland's southern tip at Julianehaab, the point from which Leif Ericson set off on his voyage. From there they will allow the currents to carry them north into the southerly Labrador current.

"Then we will leave ourselves to the current and the winds, as far as prudent navigation permits," Mr. Anderson said. "I firmly believe we shall end up in the Nantucket Sound on the New England coast." The expedition should reach America in early July, according to its calculations.

While the climate may have changed in the last 1,000 years, Mr. Anderson said, there is no reason to think that prevailing currents have changed with it. "I think, therefore, that where the sea takes us will be very much where the sea took the Vikings," he said.

He added that he believed "wholeheartedly" in the Vinland map of 1440 as "an historical document comparable with the Dead Sea Scrolls in the new light it shed on the history of our race." The map, published by Yale University last fall, is said to show that Lief Ericson beat Columbus to the New

expedition to Greenland in August will explore the possibility of constructing a seismic monitoring station on inland ice. The possibility was first proposed by a Danish geophysicist, Dr. Henry Jensen, who declared Greenland would be an excellent site for a station to monitor nuclear explosions.



The New York Times May 1, 1966

Six Britons, hoping to retrace Leif Ericson's voyage, plan to drift by cutter from the tip of Greenland (1) to Nantucket Sound (2).

World, reaching land about the year 1000.

Mr. Anderson said, that the wild grapevines to which the "vin" of Vinland probably referred were to be found along the North American coast south of Cape Cod.

Other members of the expedition are Peter Howard, 44-years old, the skipper; Lieut. T. Lee, 29, navigator; Peter Comber, 48, quartermaster; Allister McIntosh, 26, carpenter, and R. A. Garrod, 52, crewman.

The expedition will radio back an account of its journey to The Guardian. It will test equipment donated by British concerns, including specially designed nylon clothing, and it will make observations for the British Meteorological Office. The members will also record their dreams for the Medical Research Council.

Canadian Space Probe

FORT CHURCHILL, Man., March 27 (Canadian Press) — The first all-Canadian space research project started early today when a 350-pound scientific instrument package was launched on a Black Brant rocket from the Fort Churchill research range. It is designed to probe the mysteries of the aurora borealis and upper atmosphere through six independent experiments.

Norwegian Ship to Spitsbergen

OSLO, Norway—The sealing vessel Norvarg has left Tromsø, North Norway, with mail and 500 tons of supplies and equipment for the Caltex drilling crew that is searching for oil off Spitsbergen.

Many Study Arctic Flow

Iceberg Riders Trace
Current Around
North Pole

By Science Service.

COLLEGE PARK, Md. — The icy current that slowly revolves clockwise around the North Pole is constantly being measured and tested by Russian and American scientists from drifting ice stations.

Dr. Maxwell E. Britton, head of the arctic program of the office of naval research, noted that other interested countries include Canada, Denmark and Norway.

The largest drifting ice station maintained by the Navy now is about 250 miles due north of Point Barrow, in northern Alaska. As the iceberg drifts, research goes on constantly on and under the ice, under water and in the atmosphere, Britton told the spring meeting of the Washington Academy of Science.

There is a flow of sea water into the Arctic regions through the Bering Straits—and a general outward flow down past Greenland. The current drifts around the polar area at highly variable speeds—from one or two nautical miles a day to as high as 30.

Unlike Antarctica, which is a large land mass ringed by oceans, the Arctic is an ocean ringed by land. In winter, ice forms over most of the North Polar Basin, covering an expanse 1,900 to 2,500 miles. This is pack ice, always in motion and drifting with the winds and current.

On the average it is about seven feet thick, Britton said, but in some places ice blocks have collided and immense pressures have forced up ridges of ice over 100 feet thick. With the moderating presence of the sea just under this ice pack, the Arctic is much milder and less hostile to life than the Antarctic. In the spring, the pack ice begins to melt, and freshwater lakes spread out across its surface.

Iceberg Station to Close

WASHINGTON, Feb. 4 (AP) —The Coast Guard said today that its iceberg-spotting station at Argentia, Newfoundland, would be closed Aug. 1, and its personnel moved to the Elizabeth City (N. C.) Coast Guard station.

GEOLOGIST BACKS CONTINENTS' DRIFT

Says Climatic Variation Is
a Result of Movement

By JOHN NOBLE WILFORD

The New York Times

WASHINGTON, April 9 — The climate does not really change much, but continents do.

This is the theory of Dr. Warren Hamilton, a scientist with the Department of Interior's Geological Survey. He maintains that a recently completed study of the earth's ancient climates, based on new discoveries of tropical fossil remains in frigid regions, provides "strong confirmation" of the controversial continental drift theory.

The results of his study will soon be published in a number of scholarly journals.

Much of the climatic variation in the past, according to Dr. Hamilton, a geologist, has been caused primarily by the movement of continents across the face of the earth, rather than by worldwide changes in climatic zones.

"Each continent has its own pattern of climatic variations, rather than a pattern shared with all other continents," Dr. Hamilton says. "Thus, it is likely that climatic zones remain relatively unchanged in width and position, and that the continents have drifted through these zones throughout geologic time."

A number of scientists have theorized that billions of years ago the earth consisted of one or two continents. Through heat boiling up from the depths of the earth or other causes, the crust may have expanded and eventually split apart, resulting in many separate continents.

The theories first became popular in the late 19th century when scientists made much of the fact that the bulge of South America at Brazil looks as if it once snugged up to the indentation of the western coast of Africa. What is now Newfoundland, New England and the British Isles may have pulled away from Northern Europe. Earthquake zones and fault lines, such as the San Andreas Fault in California, indicate that the crust is still mobile.

On the basis of a recent study of the earth's ancient climates, Dr. Hamilton sides with the "drift" theorists. He says there have been some fluctuations in climate — thus explaining the glaciers that once extended down as far as the Ohio Valley — but that the primary tropical zones appear to have remained the same.

New Data Indicate the Ice Ages Built Up Over Millions of Years

By WALTER SULLIVAN

The New York Times

June 25

The onset of the ice ages that repeatedly buried much of North America was not abrupt, as many have believed, but gradually over millions of years, it is reported in this week's issue of the journal Science.

New data on the timetable of ice sheet growth and decay is summarized in an article by Dr. William L. Donn of the City College of New York and Dr. Maurice Ewing, head of the Lamont Geological Observatory of Columbia University.

The data, plus theoretical studies, have led them to revise their theory for the ice ages. First set forth in 1956, it said the ice ages occurred when the Arctic Ocean was free of ice, providing moisture-laden clouds that dumped heavy snows on North America and Eurasia.

This process, according to their original hypothesis, robbed the oceans of water, which became locked in the growing ice deposits on land. Once ocean levels dropped low enough, the flow of warm Gulf Stream water into the Arctic Ocean was curtailed; that ocean cooled enough to freeze; and the supply of moist air was cut off, halting the growth of the ice sheets.

New findings indicate that prolonged cooling preceded the birth of the North American ice sheets. It began in the late Tertiary Era, 10 or 20 million years ago.

Sediment from the floor of the Indian Ocean, estimated to be about 2.5 million years old, contains glacial sand carried there by Antarctic icebergs.

These sediments, layer upon layer, indicate that Antarctica has spawned icebergs ever since. Thus the ice ages, in a sense, seem to have begun there.

In Iceland, H. Wensink of the Netherlands has found glacial till under lava that is 3.1 million years old. Another such overlying formation may even be 20 million years in age.

On the continents, the ice ad-

vanced and retreated several times in ice ages whose succession is well documented, but whose timetable is still obscure. The most recent retreat, however, is indicated by the history of sealevel changes.

According to the report in Science the oceans began to rise (and ice levels to fall) about 19,000 years ago. Half the ice was gone by 13,000 years ago and virtually all had vanished, except what still remains in the form of glaciers, some 6,000 years ago.

The revised Donn - Ewing theory says the cooling of the climate began when the north and south poles migrated to their present regions. Both areas are isolated from the tempering influence of ocean currents; the South Pole is near the center of a land mass; the North Pole is within an ocean that is almost landlocked.

The start of Antarctic glaciation produced a flow of near-freezing water along the ocean floors that today still reaches as far north as the latitude of the Carolinas. This helped chill the oceans and hence the world's climate.

The fact that the Arctic Ocean was still ice-free provided enough moist air to shower northern areas with snow and initiate continental ice sheets.

This source, however, was not sufficient to feed the giant ice sheets that ultimately reached as far south as New Jersey. The growing ice cover, however, plus heavy rain and snow clouds over much of the earth, reflected enough sunlight back into space to further chill the climate until the Arctic Ocean froze.

It was now cold enough so that winds from the south — from the Gulf of Mexico and Atlantic, for example — began to deposit snow, rather than rain, and the climatic period of glaciation was under way. Siberia was not widely glaciated because it is fronted, on the south, by deserts rather than oceans.

Finally the oceans became so

chilled that their evaporation rate fell, cutting off the snow supply, and the ice began to retreat. A new ice age would not begin until the Arctic Ocean again became ice-free and thus able to supply moist air and new snowfall for the northern extremities of North America and Eurasia.

This theory implies that a new ice age could begin if the pack ice of the Arctic Ocean, which has thinned during the last century, should vanish entirely.

Missing Copter and Its Pilot Found After Yukon Search

WINNIPEG, Manitoba, June 16 (AP)—A helicopter missing for a week in the Yukon with three persons aboard was found 120 miles north of Dawson City last night by a United States Air Force C-130 Hercules.

The Royal Canadian Air Force said that the pilot, Frank Harley of Ottawa, had been found safe and near the helicopter, which had a damaged rotor, but that his passengers, Andy Moisey of Edmonton and Dick Wallington of Mayo, Yukon Territory, apparently left the crash scene Tuesday, following a creek bed in an attempt to walk to safety.

The helicopter was bound for an area 150 miles north of Dawson City when it disappeared.

The United States plane, from Elmendorf, Alaska, found the helicopter southwest of its intended flight route, apparently blown off course by thunderstorms.

Alaska Salmon Are Branded To Trace Their Wanderings

JUNEAU, Alaska (UPI) — Some Alaskan salmon are being branded like cows. With a rod heated in water, serial numbers are burned on each fish.

The purpose of the salmon brand is to identify them when they have wandered away from their home waters. A salmon's wanderlust is great and salmon are difficult to locate again when they stray.

The new technique is being used on young sockeyes at the Brooks Lake Biological Field Station of the United States Bureau of Commercial Fisheries. The brands remain legible up to 18 months.

Driftwood Under Ice

Moscow, June 11 (Reuters) — Leningrad scientists report that glaciers formed on Arctic islands at least 100,000 years ago are receding and shrinking, revealing ancient specimens of driftwood and vegetation. Tass news agency reported today.

Yet, he points out, scientists have found fossil remains of coral reefs dating back 270 million years as far north as Arctic Canada, Greenland and Spitzbergen. These seem to have occurred at the same time that glacial ice caps covered now-tropical parts of India, Australia and Africa.

Neither reefs nor glaciers, he says, could possibly have formed where these lands are now. Dr. Hamilton regards the fossil data as proving that continental drift has occurred throughout the last half-billion years.

Dr. Hamilton, who has led three geological field parties to the Antarctic, says that even that polar region was once tropical and, presumably, in a different location.

Dr. Hamilton declares that the continental drift is still going on as actively as it ever has — at rates of a few feet or a few yards every 100 years.

He postulates that the earth's crust, rather than acting on the basis of internal movement, may be "moving independently of the interior."

NEW DEVICE IS SET FOR ICEBERG HUNT

Detector to Be Installed on Planes for Annual Patrol

By **WERNER BAMBERGER**
The New York Times

Feb. 5

The Coast Guard expects good results in its annual iceberg hunt off the Grand Banks of Newfoundland this year, using a new detector.

The device, designed and assembled by Coast Guard electronics experts, is called a radiometric iceberg detector. It is small enough to be installed aboard an aircraft and is to go into use around March 1, when the service plans to start the 1966 International Ice Patrol.

A spokesman explained yesterday that the advantage of the new equipment over radar or infrared detection devices was that it was expected to work well in all kinds of weather.

Radar, he noted, is not a foolproof method of detection and infrared devices do not work well through cloud cover.

The new detector is based on the principle that any piece of matter emits electromagnetic impulses. These impulses are received by the detector. By measuring differences in thermal energy the device then determines whether the object under study is an iceberg or a piece of driftwood.

The device furnishes visual as well as graphic presentations of the radio data received by means of an oscillograph and figure presentation.

Two of these new radiometric iceberg detectors are slated for installation aboard two C-130 Coast Guard aircraft attached to the service's air station at Argentia, Nfld., patrol headquarters.

Also attached to the patrol this season are the cutters Evergreen and Acushnet. The Evergreen, based at Boston, has again been selected to conduct a series of oceanographic studies. She will also be called upon to ride herd on icebergs in the event one of these menaces to trans-Atlantic shipping drifts into the shipping lanes.

The prognosis for the current season is "slightly below average," which means that about 350 icebergs are expected to drift south of the 48th parallel between March 1 and early June, when the season usually ends.

In announcing the start of the patrol's work, the service again issued its warning to ship masters not to place too much reliance on radar for iceberg detection.

Merchant mariners were re-

Army 'City' Under Ice

WASHINGTON (NANA) — The Army has a "city under ice."

This is Camp Century, Greenland, established by the Army Polar Research and Development Center at an elevation of about 6,000 feet on the great ice-cap that covers the Arctic Island. Its primary purpose is to learn how both men and equipment perform and hold up under extreme polar conditions.

Except for marker flags and some weather observation stations, there is nothing to interrupt the view of an almost flat plain of surface snow and ice. Tunnels were dug about 30 feet under this surface for a main street and for side streets running off at various angles, much as in a small town.

Prefabricated structures about the size of large truck trailers, house personnel, offices, laboratories, shops, stores and a power plant. The under ice setup was designed for about 200 soldiers.

The establishment is run on nuclear power. The "city under ice" is not considered a permanent establishment. The walls of ice are closing in at the rate of four or five feet a year. To maintain its tunnels, as much as 40 tons of snow must be shaved from the streets each week.

mind that carefully conducted tests had proved that radar could not provide "positive assurance for iceberg detection."

The warning added that the average maximum range of radar detection of a dangerous-size growler (a small berg or a mass of floes) was four miles.

"Radar," the Coast Guard said, "is a valuable aid but its use cannot replace the traditional caution exercised in a passage across the Grand Banks during the ice season."

The first International Ice Patrol saw duty in 1914. The sinking of the British liner Titanic two years earlier prompted the patrol's establishment. It is being conducted by the United States Government and the Coast Guard for the benefit of the world's major maritime nations, which share in its cost.

Far North Weekly Started

INUVIK, Canada, (AP)—A weekly newspaper, The Drum, has been started in this outpost town 200 miles above the Arctic Circle by Tom Butters, a 49-year-old journalism school graduate from Vancouver, B. C.,

ICEBERG SEASON COMES TO AN END

Annual Hunt for Ocean Ice Is Shortest Since 1914

May 3

The shortest season of the International Ice Patrol, conducted annually by the United States Coast Guard since 1914, has come to an end.

Usually the annual hunt for icebergs dangerous to North Atlantic shipping starts late in February or early in March and continues until mid-June. This year it ran from March 1 to April 28.

Usually, an average of 350 large icebergs drift south of the 48th parallel and into position of potential danger to ocean shipping. This year not a single iceberg ventured out to sea even as far south as the 50th parallel.

The last International Ice Patrol ice chartlet, published by the United States Naval Oceanographic Office in Washington, plotted only two icebergs, both in Newfoundland coastal waters just below 50 degrees north.

A Coast Guard spokesman said from Washington yesterday that as a result of the lack of ocean ice this season all ice observations were conducted by aircraft flying from the service's air station at Argentia, Newfoundland.

The cutter Evergreen, assigned to the patrol, never ventured out of port for surface surveillance of icebergs. The vessel, however, is to sail on May 10 from Boston on an oceanographic survey cruise from the eastern slopes of the Grand Banks off Newfoundland to Greenland to determine why different oceanographic conditions exist in this stretch of water this year.

The spokesman added that the one-month experience this season with a new radiometric iceberg detector had proved "inconclusive." This aircraft-mounted piece of electronic gear, he explained, performed not too well because the bulky device affected unfavorably the flying qualities of the C-130 aircraft in which it was installed.

It is expected, however, that the device will be redesigned to cut down its weight and bulk and be used again in the 1967 ice patrol season, the spokesman added.

who first saw the Far North in 1948. Its six pages are in English, Eskimo and Loucheux Indian dialect. The first issue had a half page in English about preparation and eating of abundant reindeer meat.

The device, which furnishes visual as well as graphic presentations of radio data received by means of an oscillograph and figure presentation, is based on the principle that any piece of matter emits electromagnetic impulses. These impulses are received by the detector, and by measuring the differences in thermal energy the device determines whether the object under study is an iceberg or a piece of driftwood.

ICEBERGS SPOTTED IN ATLANTIC LANES

June 17

While New Yorkers were sweltering yesterday, American sailors and aviators in waters off Newfoundland were looking for icebergs.

The presence of large icebergs in these waters, traversed by much of Atlantic shipping, was disclosed by the Holland-America liner Statendam. The liner informed the Navy's Oceanographic Office that a large berg had been seen about 130 miles east-northeast of St. John's Nfld.

A Coast Guard spokesman said from Washington yesterday that Coast Guard aviators from the Argentia Coast Guard air station in Newfoundland had been ordered to keep an eye on "this shipping lane intruder."

The spokesman added that the berg's position did not yet make it a menace to shipping, but that it might become one if it drifted 100 miles or so south without disintegrating substantially.

Meanwhile, 60 miles north-east of the Canadian port, aviators from the Navy's Argentia Fleet Air Command were reported to have made low-level practice attacks all day Monday on an iceberg.

That berg, also spotted by the Statendam, was reported to be a large one. According to Coast Guard sources, it was considered unusual for there to be so many icebergs in the heavily traveled North Atlantic steamer lanes so late in the season.

Iceberg spotters in the area, in addition, also reported the presence of a very large berg afloat in coastal waters at a point about 120 miles north of the Newfoundland port.

Ice Shows Its Age With Rings

WASHINGTON—Ice reveals its age by rings similar to those found in trees, the National Geographic Society says. On Alaskan ice fields, each year's deposit of snow is separated by a faint gray-brown layer of dust and pollen that has fallen on the ice during the summer.

Thick Ice on Arctic Ocean

Ice covering the Arctic Ocean is usually 9 to 12 feet thick, according to the National Geographic.

Soviet Polar Exploration

By Mikhail Milkin

S.P.A. JOURNAL

Society of Philatelic Americans

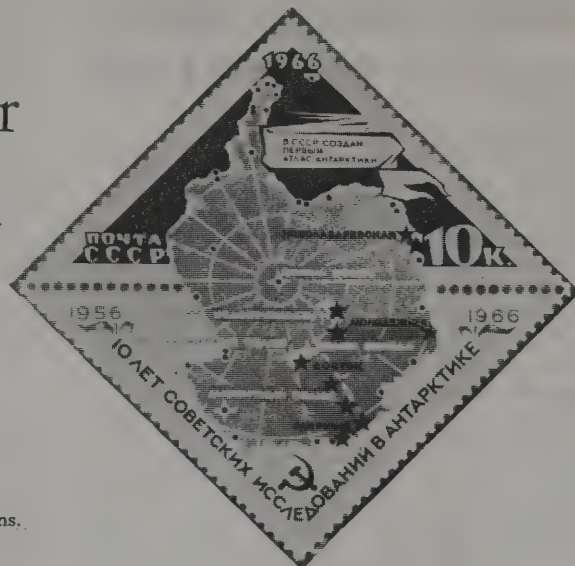
From the very first years of its existence the Soviet Union has attached major importance to the exploration of its northern areas beyond the Arctic Circle, the Arctic Ocean and the North Pole. Research expeditions have been sent out and scientific stations established on drifting ice. To commemorate polar exploration the Ministry of Communication has issued dozens of colorful postage stamps.

The first of these was a series dedicated to the cruise of the icebreaker Malygin and her encounter with the airship Graf Zeppelin in 1931 in the area of Franz Josef land. The series of eight stamps (four imperforate and four perforated) pictured an exchange of mail between the Soviet icebreaker and the German airship (Scott C26-33; Minkus 511-514).

In 1934 an expedition headed by Academician Otto Schmidt was forced to abandon ship when the icebreaker Chelyuskin was compressed by ice. They were later rescued by air and a set of ten stamps issued in 1935 to commemorate the



This article on the Soviet Union's polar exploration stamps by Mikhail Milkin, assistant head of the Chief Philatelic Office in Moscow, was provided by courtesy of Novosti Press Agency.



feat. Schmidt is pictured on one of the stamps (Scott C59; Minkus 622) against a background of the ice camp to which the crew and expedition members moved. The high value of the set (Scott C67; Minkus 630) shows the abandoned camp as polar bears watch airplanes evacuate the last members of the expedition.

In May 1937, a Soviet airborne expedition headed by Schmidt landed four explorers — Ivan Pap-



anin, Yevgeni Fyodorov, Ernest Krenkel and Pyotr Shirshov — on the ice at the North Pole to establish a drifting station in the Central Arctic. This event was commemorated four postage stamps (Scott 625-628; Minkus 700-703) two of



them show against the background of a map of the Central Polar Basin the route of the expedition from Moscow to the North Pole and the

four heavy aircraft which landed at the Pole; the two other stamps show the state flag of the Soviet Union flying over the North Pole.



The four daring explorers are pictured on two stamps issued in 1938 (Scott 645 - 646; Minkus 732-733) when they were removed from the drifting ice floe by an icebreaker 274 days later.

No sooner had Soviet people settled in the center of the Polar Basin then two outstanding events took place which were commemorated



by postage stamps. One series of four stamps was dedicated to the crew of the single-engine airplane piloted by Valery Chkalov, which in June 1937 made the first non-stop flight from Moscow to the United States via the North Pole. These stamps (Scott 636-639; Minkus 711-714) bear, against the background of the solar regions and the route of this trans-Arctic flight, the portraits of the three aviators—Valery Chkalov, Georgi Baidukov and Alexandr Belyakov — who received the USSR's highest title, Hero of the Soviet Union, for their flight.

Another series of three postage stamps (Scott 640-642; Minkus 715-717) marked the second non-stop flight from Moscow to the United States via the North Pole made in July 1937 by the crew of Mikhail Gromov who set two world records simultaneously — for straight flight-range and broken-line flight-range. All three stamps carry the



portraits of aviators Gromov, Danilin and Yumashev. It should be noted that in those days Chkalov's and Gromov's "ANT-25" planes developed a speed of about 100-110 miles an hour.



In 1940, after the icebreaker, Georgi Sedov completed an 812-day Arctic drift, a series of four postage stamps was issued to honor her crew (Scott 772-775; Minkus 850-853).

The further exploration of the Arctic by Soviet scientists in the post-war period required regular weather and ice studies and forecasting. For this purpose, the North Pole-2 research station was set up in 1950 on the drifting ice of the central part of the Arctic Ocean. In the years that followed other drifting research stations were established. The Soviet Union issued a series of three multi-colour stamps (Scott 1765-1767; Minkus 1903-1905) in honor of the Polar explorers who worked on these stations and of their research which contributed outstanding discoveries to science. The first two stamps showed a polar research station with living quarters and structures for meteorological and aerological ob-



servations scattered over the ice. A meteorological pilot-balloon is being launched into the stratosphere and a helicopter is soaring in the air. Research observations are pictured on the third stamp (one ruble denomination) with the Northern Lights in the background.

At the close of 1955 two Soviet air mail stamps with denominations of one and two rubles (Scott C95-C96; Minkus 1900-1901) were overprinted "North Pole — Moscow." They were intended for the mail agencies on the "North Pole" drifting stations. These stamps were issued in 15,000 sheets and so have become a philatelic rarity now.

A "North Pole" souvenir sheet of four stamps (Scott 1767a; Minkus 1905A) issued in 1957 and de-



signed in the Arctic style. In the foreground there is a polar bear standing on an iceberg, in the background a research station. All this is against a background of Northern Lights. In 1962 this souvenir sheet was reissued, this time with a jubilee overprint to mark the 25th anniversary of the establishment of the first North Pole scientific drifting station (1937-1962). The overprint was made on remainders of the 1957 issue and so it has become a philatelic rarity.



1957 "North Pole" souvenir sheet as reissued in 1962 with an overprint for the 25th anniversary of the first Arctic drifting station.

Exploring the Antarctic

The vast continent beyond the Antarctic Circle — Antarctica — was discovered 146 years ago by a Russian geographical expedition which sailed on the sloops *Mirny* and *Vostok*, commanded by Fabian Bellingshausen and Mikhail Lazarev. The discovery of Antarctica in 1820 refuted the claims of some explorers, including Capt. James Cook, that no such continent existed.



In 1950 when the 130th anniversary of the discovery of Antarctica was marked, a series of two postage stamps (Scott 1508-1509; Minkus 1620-1621) was issued in the Soviet Union. One of them bears the portraits of Bellingshausen and Lazarev and a globe with the route of the expedition. The other shows a map with the sea route of the Russian geographical expedition on the sloops *Mirny* and *Vostok*. On the left side, there are emperor penguins, the inhabitants of Antarctica. Both stamps are quite rare now.



In 1956, the Soviet Union issued a multicolored stamp with a geographic map of the South Pole Basin, showing the location of Soviet

research stations in Antarctica (Scott 1884, Minkus 2004). In the lower part of the stamp we see, against the background of a great iceberg, the diesel electric ship *Ob* which is a frequent visitor to this faraway area of the Southern hemisphere. Two emperor penguins are at the left.



1959 saw the issue of an interesting series of four Soviet stamps for the International Geophysical Year (Scott 2232-2235; Minkus 2374-2377). The first of these stamps (10 kopecks) deals with glaciology — the science that studies the properties and the development of glaciers. It shows scientific observations for studying Antarc-



tica's ice shield. The third stamp of the series of 40 kopeck denomination shows the Soviet *Mirny* base against the map of Antarctica with Soviet inland research stations.

In 1963 the Soviet Ministry of Communication issued another series of four stamps dedicated to Antarctica (Scott 2779-2782; Minkus 2948-2951). The 3 - kopeck stamp which bears the inscription "Antarctica — Continent of Peace" depicts the diesel electric ship *Ob*.



The second stamp, with the inscription "To the Pole of Inaccessibility", shows a tractor - drawn sledge caravan of the Soviet expedition on its way inland the Antarctic conti-



nent which is covered by an ice layer about 1,500 metres thick on the average. The 6-kopeck denomination is dedicated to "Polar Aviation." Against the background of the globe, there are two airplanes. They are the Soviet airliners which made a super-long-range transcontinental flight across four continents and two oceans from Moscow to Antarctica in 1961. The series is



completed by a 12-kopeck stamp dedicated to whaling. The stamp bears the inscription: "Whaling Base 'Sovetskaya Ukraina'"; a blue whale in the foreground is the largest of the whale species.

A series of five stamps under the title "Exploration and Mastering of the Arctic and Antarctic" was issued in 1965. The first two stamps, each of 4 kopecks denomination, are designed as a single Arctic panorama, with only the perforation dividing the scene into two stamps. The stamp at the left shows the icebreakers *Taimyr* and *Vaigach* in the Arctic ocean, passing over the Northern Sea route from East to West in 1915. This expedition headed by the Russian scientist



Boris Vilkitsky discovered the Northern Land on its way. The strait which separates the Northern Land archipelago from the Asian continent was named for Vilkitsky.

The picture of the icefield under the gray-blue sky is extended to the right-hand stamp of the pair where we see the atomic icebreaker "Lenin" furrowing the ice-clad ocean under the cold red sun shining through an icy haze. The inscription reads: "Atomic Icebreaker 'Lenin' Leads Vessels Through Vilkitsky Strait."



The third stamp — 6 kopecks — gives a general view of the seaport and an Arctic town on Dixon Island. Polar seamen say the stamp gives an exact reproduction of the colors and appearance of the place. The stamp was issued to commemorate the founding of Dixon township 50 years ago.

The fourth stamp, with a denomination of 10 kopecks, marks the 145th anniversary of the discovery of Antarctica by the Bellingshausen - Lazarev geographical expedition. The square design shows the

expedition's vessels — Mirny and Vostok — in the Antarctic Ocean near Antarctica.



The last stamp in the series shows the Soviet South Pole station "Vostok" located in Antarctica near the Southern geomagnetic Pole and the world's Pole of Cold.



The dark violet background of the stamp with bluish-grey snow and the moon in the sky, surrounded by a frosty halo, gives a good idea of the boundless cold desert of the inland areas of Antarctica. The stamp gives a general view of the station: the explorers' huts, antenna masts and radio telescopes. It has a denomination of 16 kopecks.

All these stamps were designed by Yuri Ryakhovskii.



A new series in this field was issued in January of this year. It is dedicated to the 10th anniversary of Soviet explorations in Antarctica. Three triangular stamps, one with a triangular label attached, are printed together on a single sheet, forming a large triangle.

The design of the stamp with the label shows Soviet South Pole stations stretching from the centre of the South Pole against the background of a map of Antarctica. (Top of page 497). The text on the label notes that the first atlas of Antarctica was compiled in the Soviet Union.

The first stamp of the series shows a dark polar night with snowcat tractors in the foreground. On another stamp we see the diesel-electric ship Ob which has recently again left for a cruise in Antarctica. A group of emperor penguins "welcomes" the strangers. The top corner of the triangle bears the anniversary date: "X Years." All stamps are of 10-kopeck denomination.

ROCKETS TRANSMIT DATA ON AURORAS

WASHINGTON—The beautiful and mysterious aurora borealis has excited men for millennia, but only in recent years have scientists really begun to understand the phenomenon.

The auroras had eluded close scrutiny not only because they are visible most frequently near the poles, but because they occur 40 to 130 miles above the earth's surface, the National

Geographic Society points out. Balloons can't get that high, and satellites that descend below 200 miles burn up in the atmosphere.

The solution was to launch rockets carrying instruments to transmit data about the auroras back to scientists who can scan the results at the same time they are watching the auroras.

Scientists have pieced together a fairly complete description of the phenomenon, which begins not on the earth, but on the sun. This blazing star occasionally flares, sending out streams of charged par-

ticles—electrons and protons.

As the sun revolves on its axis, the huge streams sweep out like jets of water spurting from a rotating lawn sprinkler. Now and then, a stream of particles catches the earth in its path. Then, for hours or days, the planet is drenched in a shower of electrified particles.

The earth's magnetic field guides the particles toward the North and South Poles, where they are drawn downward.

The highly accelerated electrons and protons collide with atoms and molecules of oxygen

and nitrogen in the atmosphere, producing light and creating a glow in the sky. The agitated oxygen emits both green and red light; nitrogen gives off violet and blue.

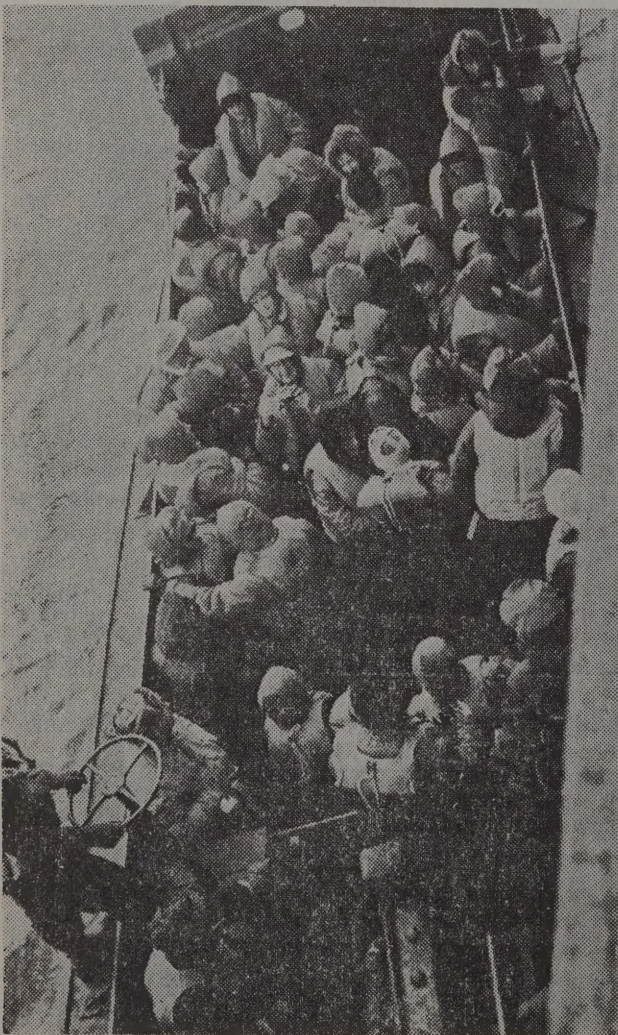
Although most of the aurora's light cannot be seen by human eyes, it can be detected by instruments.

Plan Pole Crossing

Oslo, June 15 (Reuters) — Six Norwegians today made plans today to cross the North Pole on skis and dog sleds in 90 days next Winter.

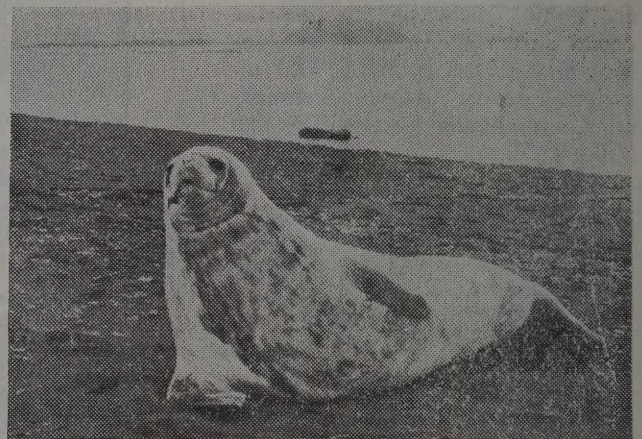


Chief vacation attraction of the Antarctic, writes John P. Chisholm of North Muskegon, Mich., who made the trip, is the scenery "out of fantasyland"—one entrancing sight after another with mountains rising sheer from the sea amidst vast vistas of floating icebergs, ice tables, and fields of smaller ice floes.



United States marines in their landing craft ready for an invasion? No! Merely American tourists going ashore from the good ship Lapataia in Antarctica.

[Argentine Navy Photo]



Seal on King George Island of South Shetlands gives Antarctic American tourists a cold reception.

[John A. Chisholm Photos]



Penguins near United States scientific Palmer station on Anvers Island, Antarctica, are puzzled by invasion of American tourists into their rookery. Smaller, fuzzy-looking birds are young penguins, not quite old enough for formal wear.